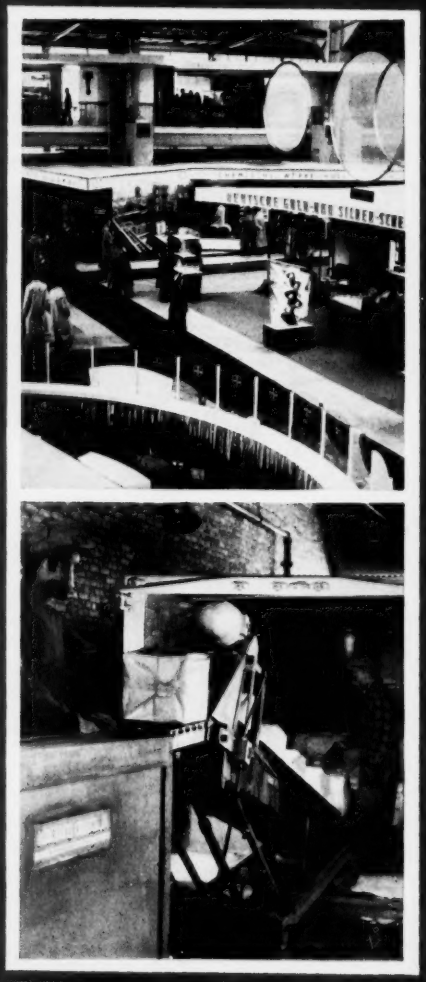
Chemical Week

June 7, 1952



German chem show features new products, points up quick comeback . . . . . p. 18

What's your research cost per man? Here's the latest yardstick . . . . . p. 31

CW Camera visits chemical "general store", sees slick distribution center shift into high . . p. 38

U. S. crankcases will gulp a fat 30 million gals. of lube additives this year . . . . . p. 49

Resorcinol slips out from under NPA control; more tonnage is on the way . . . . . p. 59

A McGRAW-HILL PUBLICATION

All chemical and a yard wide...

Modern fabrics take their cue from chemistry . . . viscose and acetate rayon, nylon and now the new synthetic fibers, all were first grown in the laboratory. Today the American Textile Industry looks to chemistry for new and improved fibers, fabrics and finishing methods and to chemical manufacturers for greater quantities of textile chemicals.

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SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

9642

Chemical Week

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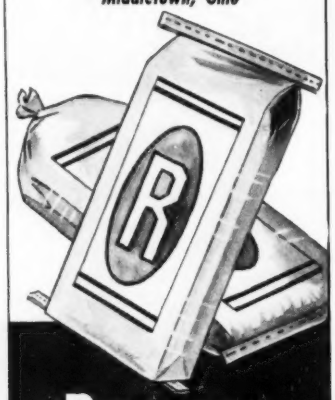

RAYMOND
MULTI-WALL
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OPINION . . . . .

Overselling is Dangerous

"Everybody wants to get into the act." That sums up what's going on in soil conditioners today. But, unfortunately, a few of the players who covet a stage role are bad actors—and their activities may well evoke censure of the whole production. Therein lies a threat to the entire soil conditioning business. Let's look at what has happened in the past few weeks and what looms on the horizon:

It was, of course, at the turn of the year when Monsanto first unveiled the results of the three-year research project it had conducted to develop Krilium. At that time, Monsanto's Charles Thomas and Ted Hochwalt were confident of the worth of their discovery but sagely cautious in their claims. They presented their research observations in detail and appraised them objectively; they shunned speculative extrapolation of the data and strove to prevent newspapermen from reporting Krilium in Sunday Supplement millions-now-starving-will-soon-be-well-fed vein. This is what they sought: ". . . to acquaint scientists with our work . . . to interest agronomists and other qualified workers to join us in work on this product to determine its practical utility."

With that objective in mind, they planned to make some 250,000 lbs. of the conditioner available to competent experimenters this year and, subsequently, if the indications were favorable, to begin test marketing during the latter part of the year.

However, within days after the Monsanto report was filed *(CW, Jan. 5)* there were clearly audible rumblings throughout the chemical industry. Research directors—and market researchers—were being queried and chided. The main questions: What do we know about soil conditioners? What's the patent situation? How does our marketing opportunity shape up?

And they were only rumblings until early in April. Since then a roster of companies has plunged into the soil conditioner business. Today it stands like this. (By the time this is in print—tomorrow—there may well be more):

AcriSoil Co. . . . . AcriSoil
American Cyanamid . . . . Aerotil
American Polymer . . . . Agrilon
Dreers' . . . . . Fluffium
Niagara Chemical . . . Terra Kem
Nott Mfg. Co. . . . . SoiLife
Wilson Organic . . . . . Poly Ack

In addition, B. F. Goodrich Chemical has just begun the manufacture of solid sodium polyacrylate and Du Pont will, within the next few weeks, launch a soil conditioner. One result of all this frenetic activity has been, of course, an updating of Monsanto's own marketing plans. Its Merloam formulation of Krilium (which, incidentally, is no longer a polyacrylate) is now being sold nationally.

There is no gainsaying that many of the companies battling for a position in the soil conditioner business are responsible—that is, technically responsible. Others are not. And in striving to be "first" with "wonder chemicals" and "miracle conditioners" some wild and all-encompassing claims are being made. Here are a few:

"This . . . offer is strictly a non-profit public service. We want you to try X . . . to see that the reports you have been reading in the newspapers and magazines are true . . . to see how X gives new growth-promoting vitality to soil . . . how it changes heavy clay to *rich* crumbly loam, sandy soils to good tilth . . ."

"A single treatment of Y will result in a sturdy stand of turf and flourishing plant life all season long . . ."

"Z converts dried out, hard-packed soils into porous, *life-sustaining* loam in just a few days . . ." *(Italics are ours.*—ED.)

It is, perhaps, not proper to say that all these statements are baldly untrue. However, there is no doubt that they are misleading and carry a connotation not in keeping with the facts. It is suggested, and strongly suggested, that these "miracle" conditioners can be applied by anyone to barren land and that decrepit soil will be instantly converted into rich, fertile loam.

That, today, seems to be the impression that the public has. And, just as importantly, that is what most retailers believe. (We spot-checked retailers last week, found them completely confused—not one really understood just what a soil conditioner can do, what it can't.)

Soil conditioners can—and it has been amply demonstrated—markedly improve structures of *some* types of soil; increasing the fertility of soil does not necessarily follow.

This must be recognized too: Soils are highly variable in composition, and both weather and climatic conditions are highly variable in character. Soil conditioners should not be glibly advertised as panaceas. They're not. Nor

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OPINION . . . . . .

should this be overlooked: People seldom read labels carefully . . . or even if they do they often do not heed the directions. Any impression conveyed through blatant promotion cannot be countered by merely affixing a cautioning, conditional label to the product itself.

The more sober (and foresighted) companies are, naturally, diligently trying to educate consumers to stave off the trouble which looms. That, we believe, is essential. And a thorough educational job must be done on the distributors and retailers *now*. Otherwise, by this fall, and certainly by next year, the very words, "soil conditioner" will be anathema to the public and a promising chemical market will have been permanently ruined.

—**W. Alec Jordan**, *Editor.*

Labor Fiat

To The Editor: I was incensed to read your news report "Labor Fiat" (May 24) and the highly critical references you made to the government administrators who addressed the CIO Convention. It was, in my opinion, far, far from objective reporting to say:

"V. P. Barkley and Labor Secretary Tobin . . . speaking at the union's sixth constitutional convention . . . *courted* cheers from labor, curses from industry, by such *brutal* statements as calling industry un-American for not *gulping* down WSB's recommendations, by *rooting* for a union victory . . ."

That is violent anti-labor reporting and borders on the scurrilous . . .

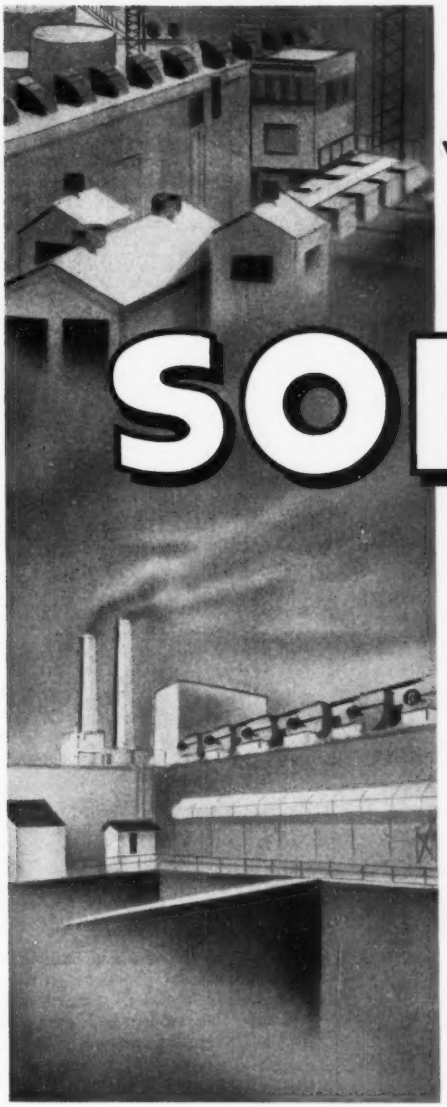
Name Withheld*

We disagree. We think that the words we used, and we presume that is what our subscriber objects to, are the only ones applicable in the case: The Government officials did court cheers, the Un-american statement is brutal, and industry is being urged to gulp down the WSB package. Said Tobin, too, and so we reported: "I am not impartial . . . I am behind the union heart and soul."—Ed.

Look at Mid-West

To The Editor: We found the article entitled "Easy on the Nose" (May 17) interesting and informative. However, in all fairness to our own mid-western paint manufacturers we hope the trade will soon know that eastern paint makers are not the only ones

* CW believes that this reader has a right to express his views, prints his letter in full. However, so that we too may feel free to express our views, we are voluntarily withholding his name.



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Atlanta, Georgia — Lockland, Ohio

OPINION . . . . . .

making odorless paints, nor were they necessarily the first . . .

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We believe we are among the very first to market odorless semi-gloss and high-gloss finishes . . .

We hope follow-up stories on odorless paints will include reference to mid-western plants . . .

L. H. GIBBS, JR.
Rockford Paint Manufacturing Co.
Rockford, Ill.

Rodent Repellents

TO THE EDITOR: We read with interest the news article in your May 10 issue concerning rat repellents.

However, we noted with regret that you named Du Pont, Eastman Kodak, Monsanto and Sharples as suppliers of tetramethyl thiuram disulfide and did not name the Naugatuck Chemical Division of U. S. Rubber . . . We are, in fact, a large supplier under our name Tuex, and I believe we supplied the samples used by the Fish and Wild Life Service in the rodent repellent program. We furnished them with samples . . . have been cooperating in the program.

M. J. TIERNEY
Manager
Market Research, Patents & Contracts
Naugatuck Chemical
Naugatuck, Conn.

TO THE EDITOR: We have read your article on rodent repellents with a great deal of interest . . . feel that it presented the problem in a very precise and interesting manner . .

JACK F. WELCH
Fish and Wildlife Service
Denver, Col.

TO THE EDITOR : . . . Your article on rodent repellent vinyl film was, in my opinion, well done . . . should attract a lot of attention . . .

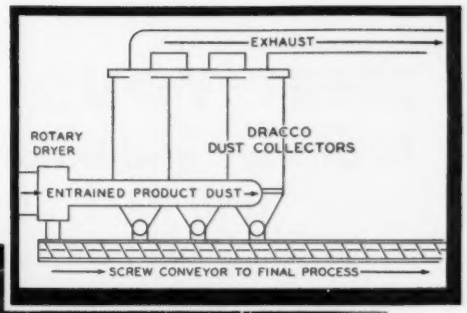
J. PHILIP COURTNEY
B. F. Goodrich Chemical Co.
Cleveland, Ohio.

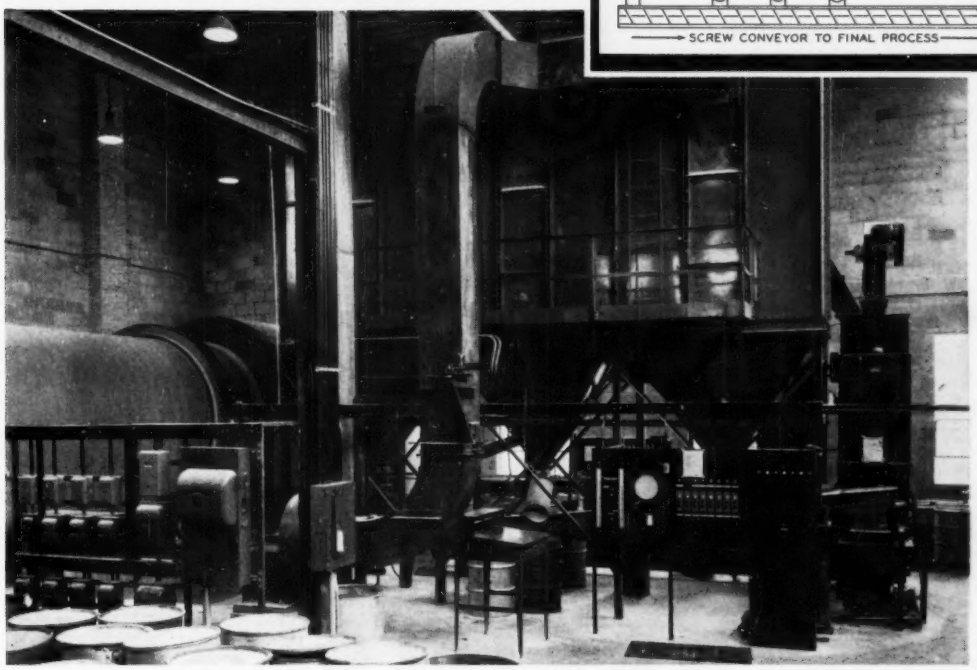
CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: The Editor, Chemical Week, 330 W. 42nd St., New York 36, N. Y.

FERRO CORPORATION, BEDFORD, OHIO, SAYS:

Today IS NO TIME TO GAMBLE...





Dracco Filter (center) at Ferro's Bedford plant recovers all napalm entrained in hot air exhaust from rotary drier (left). Diagram indicates how recovered material is discharged to screw conveyor, which moves all napalm to final processing.

Particularly with Production Efficiency!

The Ferro Corporation knows that today's industrial conditions with their high costs and accelerated production demands make peak-efficiency operation a must!

At its Bedford (Ohio) napalm manufacturing plant, Ferro is using Dracco Dust Control Equipment, which assures high efficiency by recovering 1% to 5% of the napalm processed.

Napalm is used to make jellied gasoline for fire bombs and flame throwers, and during processing, it is dried in a huge rotary drier with a blast of 320° F. air. This blast entrains fine napalm dust, which would be lost except for the reclaiming action of Dracco Equipment.

The dusty air is exhausted from the drier through a Dracco Multi-Bag Filter which recovers all the entrained material. The result is that none of the product is lost and Ferro's plant and surrounding areas are kept clean.

This is typical of many installations in which Dracco Dust Control Equipment guarantees top-efficiency production. Why not investigate the application of Dracco Equipment and Dracco techniques to your dust control problem?

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AD·63 AD·21

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Chemical Week

BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

Biggest news of the week for the chemical industry occurred in the closely related steel industry. Less than an hour after the Supreme Court declared the Government's seizure of steel plants unconstitutional, CIO's Philip Murray called his workers out on strike.

Whether President Truman invokes Taft-Hartley or waits until Congress passes specific legislation, it seems clear that the chemical industry will feel a triple effect: (1) shortage of some types of steel for new construction; (2) tightening of the coal chemicals market; (3) higher production costs as the pressure of the steel wage settlement—small or large, a hike is certain—makes itself felt.

Corporate revolution of the week was Allied Chemical & Dye's creation of a Nitrogen Division to operate plants and sell products formerly in the bailiwick of Solvay Process Division's organic and nitrogen sections. This makes Allied's sixth operating division.

Although it may look like a mere change in name, it cuts far deeper. The other five divisions grew out of the companies which were merged to form Allied; the new one was established for functional—rather than historical—reasons.

Virtual voiding of patents by compelling licensing is fast becoming a favorite weapon of the government in anti-trust actions.

In affirming a decision in the Besser Manufacturing case, the U. S. Supreme Court last week added another precedent to the growing number calling for compulsory licenses.

The Court again cited the National Lead case, which was the basis for a lower court's decision in the Du Pont-ICI case (CW, May 31).

The Supreme Court, upholding the government in the Besser case, agreed that compulsory licenses on a fair royalty basis are not punitive, confiscatory, nor inappropriate. "Compulsory patent licensing is a well-recognized remedy where patent abuses are proved in anti-trust actions and it is required for effective relief."

But the government was on the receiving as well as the dishing-out end of criticism last week. One target: the atomic energy program.

Some Washington observers, newspapers (e.g., the Christian Science Monitor) and organizations (e.g., Federation of American Scientists) are beginning to question whether the program is being operated efficiently, whether private industry couldn't develop atomic power faster.

These questions—as well as others on our utilization of natural resources and scientific manpower—were to be aired at hearings scheduled for April 16 by the Joint Committee on Atomic Energy, but postponed indefinitely. AEC is now preparing its answers.

U. S. participation in the International Materials Conference has also called down the wrath of lawmakers and industrialists.

Some time ago a group of House Republicans headed by Rep. Dondero (Mich.) described the Conference's work as a "cruel injustice."

DPA head Manly Fleischmann countered that IMC had granted U. S. users more copper—the commodity in question—than they had

bought; and the world price would have been higher had it not been for IMC.

But last week Goodrich's John L. Collyer reiterated the charges that IMC is a "super cartel" which has taken over the functions of a free market, asked for laws "to limit the authority of the executive branch to participate in cartels." He particularly fears similar control of rubber.

Budget-conscious Congressmen probably won't give the National Science Foundation more than $5 million for the 1952-53 fiscal year.

The House slashed President Truman's $15 million figure to a bare $3½ million. The Senate will likely be more lenient, but the conference compromise amount won't likely top $5 million.

Success is turning the U. S. Department of Agriculture's head—to new insecticide research fields.

Cereal and forage crop pests have been controlled so well during the past few years that USDA entomologists can now direct a greater portion of their research effort against other pests.

Now under way is a crop-by-crop check—to see where men and money can make the most telling contribution.

Monsanto was in the news with Krilium again. Now it appears that in its original disclosure, made to the AAAS (CW, Jan. 5), the company was talking about a whole family of compounds, identified only one of them as hydrolyzed polyacrylonitrile (sodium polyacrylate).

Caught off base by the fast footwork of its competitors and trouble in buying acrylonitrile, Monsanto now admits that its Merloam formulation isn't an acrylate at all, is a vinyl acetate-maleic acid compound —raw materials of which it has well in hand.

Monsanto's Charles Thomas adds that the Merloam formulation is twice as effective as acrylonitrile products in home garden use.

Why doesn't Monsanto make a liquid soil conditioner? Thomas says they don't work as well, adds that the company may bring one out if it can overcome present limitations.

The statement "clarifies"—as indeed Thomas intended it to do—but it also strikes the ringside gong for another round of competitive claims in the scrabble for gardeners' dollars.

"Package plants" for tonnage oxygen are fast becoming a trend.

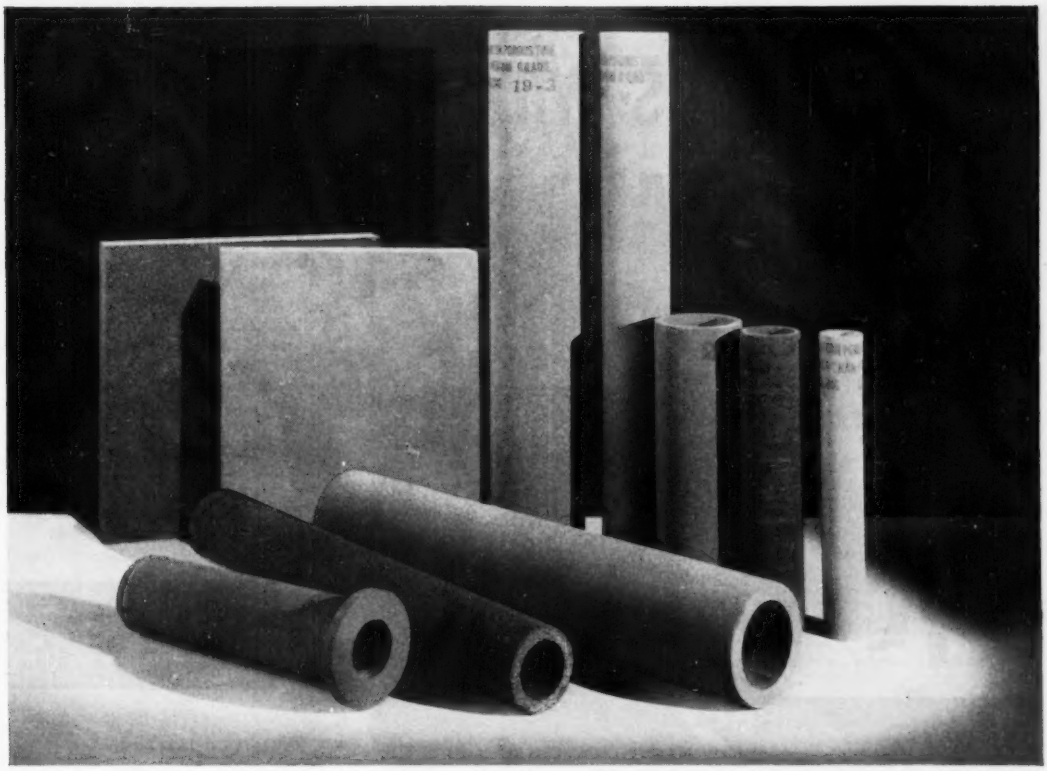
Joy Manufacturing Co. was first with its completely automatic unit. Now H. K. Ferguson has bought all process and patent rights on the Elliott process, will install plants on a turn-key basis.

Ferguson envisions some whopping big plants: up to 1,000 tons (25 million cu. ft.) per day.

Now that Food & Drug Administration clearance has been obtained, you can expect to hear more about phenylbutazone, an anti-arthritic drug that has some advantages over cortisone—particularly in price.

Although it isn't as effective (relieves 70%-80% of sufferers compared with cortisone's 90%), it works on a wider variety of rheumatoid diseases, produces fewer harmful side-effects. But the pay-off is the price: Cortisone still costs the average patient $2.25 a day despite recent price slashes, but the new drug costs 30¢ a day.

. . . The Editors



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BUSINESS & INDUSTRY . . . . .

Rubber Next

Next on the list of major unions to get on the higher-wages, new-contract trail will be the United Rubber Workers (CIO). Negotiations will begin with B. F. Goodrich Co. on June 9, with Firestone Tire & Rubber on June 25. U. S. Rubber has been notified that the union would deem it friendly to talk, and Goodyear is next.

Basically the union will be seeking a 20¢-an-hour increase, improved pensions and insurance programs, and productivity pay benefits among other gains. Whatever is done in any one of the four talks will likely set the industry pattern.

Move on Metals

Horizons, Inc., one of the major factors in titanium development work (via Horizons Titanium) is diversifying into two other metals through the medium of subsidiary corporations.

It has set up Diwolfram Corp., and Horizons Zirconium Corp. Right now, Horizons President Edwin T. Goodridge is uncommunicative on details, but the company names alone seem to indicate (1) that Horizons researchers have come up with some promising information on zirconium and tungsten, and (2) that further tungsten research will have two corporate sponsors.

Horizons' plans had new cash backing recently (*CW, April 5*), when Rockefeller interests bought a 20% interest in the parent company to complement the 14% interest held in Horizons Titanium. (Ferro Corp. holds a 20% interest in Horizons Titanium; the remainder is held by Goodridge and Eugene Wainer, Horizons founders.)

The company has 80 research workers at its Princeton, N.J., facilities whose work runs the gamut of metal and metal chemicals study. Much of its research, when commercial possibilities are proved, is expanded via a subsidiary corporation, if it comes within the over-all metal process development field. Other projects are still in reserve.

Company titanium plans have been in the news on another count. Recent published reports intimated that Union Carbide had contracted to use Horizon's process. Carbide denies signing any agreement.

ACS's BRITTON, NAM's KEYES: In recalling reservists, civilian judgment.

In Industry's Reserve Too

Civilian control over recall of reservists to active duty is urged by industry leaders, professional groups, unions.

Reasons: military dependence on industrial output, technological superiority; growing percentage of 18-26 year olds in reserves; shortage of engineers, scientists.

Members of the Senate Armed Services Committee had a rare day in their Capitol experience when both the CIO and the National Association of Manufacturers appeared before them last week to offer similar testimony.

These long-time rivals in most matters of national industrial importance both urged that recall of reservists to active duty be vested in a civilian agency. In their stand against military supervision of reserve call-ups, they were joined by professional engineering and scientific organizations also testifying before the Committee. The hearings are on the Armed Forces Reserve Act of 1951 (HR 5426) which has already passed the House.

Edgar C. Britton, president of the American Chemical Society and director of Dow Chemical's organic research laboratory, called for creation of a special civilian agency to handle the program. Donald B. Keyes,* consultant to NAM's Committee on Research, proposed review and selection of reservists by an organization such as present Selective Service. William Lavelle, speaking for the CIO, echoed the latter plan as one possible solution, as did other witnesses.

But all were agreed that leaving the authority for recall with the military, as provided in the existing bill, might undermine industrial mobilization in event of full-scale emergency.

Long Smoldering: Current Senate hearings on the so-called "reserve forces policy bill" are the latest developments of the reserve-recall arguments that has been brewing since Korea. It stems from charges that recall to duty of reservists has been arbitrary, dangerous to industry, and mishandled by the military.

There is stiff opposition to an independent civilian board to screen recall of reservists. Odds now are that this measure will be watered down or even dropped. But there remains a chance that a civilian group may be given a place in screening a group of super-essential reservists such as scientists and top-flight production men.

Several witnesses pointed out that the problem has become serious be-

* Ex-Heyden Chemical vice president and wartime chairman of the Chemical Referee Board of the War Production Board.

cause of the enlargement of reserves. Britton said that "distress and hardship" followed from the hasty recall of reservists after the outbreak of the Korean conflict, and predicted the situation will be worse in a future emergency.

Already there are more reservists than before Korea, Britton said, and suggested that if universal military training and other proposed legislation be adopted, within a few years the great majority of able-bodied men from 18 to 26 would be reservists.

High Proportion: In a survey conducted by the National Society of Professional Engineers, it was found that one out of every four respondents under 35 was in a reserve organization, according to Paul H. Robbins, executive director.

Another sore point was touched upon by Carey H. Brown, chairman of the Engineering Manpower Commission of the Engineers Joint Council, who stressed the need for distinguishing between engineers and technicians.

Brown said: "We cannot match possible enemies in numbers . . . each person (must) be utilized at his highest capacity . . . needs of operating units of the armed forces are primarily for technicians and operators and not for professional engineers. Yet . . . billet designations may call for 'engineer'." Keyes made the same request in asking that engineers not be used as technicians or for nonprofessional jobs.

Brown also mentioned a critical shortage of scientists and engineers facing the country, said there is a current backlog of demand for 60,000 engineers. Reliable estimates of the country's needs, he continued, are 30,000 new engineers per year, yet for the next five years colleges will be graduating an average of only 19,000.

Balance at Home: All of this Britton asserted, points up the need for an agency that will be able to weigh a reservist's worth to the military against his worth to the industrial mobilization machine. He explained that he is concerned primarily with reservists not in organized or ready units, and that responsibility for calling up active organized units should rest with the Defense Department.

For, he concludes, "The armed services wish to maintain a balance of manpower skills in the combat army. It is just as essential that this be maintained in the production and research army."

Though scientific personnel may be in the military reserve, they're in industry's reserve too. And each needs the other.

Tracy Exits—Talking

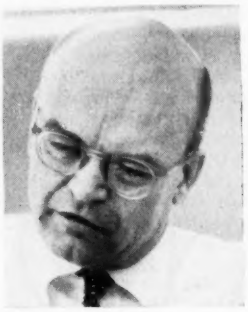
As Osgood V. Tracy last week was preparing to hand over the directorship of NPA's chemical division to George E. Holbrook (*CW Newsletter, May 31*), he voiced several predictions on the chemical aspects of mobilization—in effect, a progress report to the industry.

In an interview with CW's Washington editor, jut-jawed Tracy made these observations:

"Chemical expansion has more than kept pace with the over-all mobilization program which is now at the half way mark. By the end of this year, we should have almost 12% more capacity than we had at the end of 1951, and better than two-and-a-half times what we had in 1939.

"In many ways, expansion now is different from the earlier program. Then we were concentrating on tonnage chemicals; now our view encompasses many more—basic and specialized."

"I cannot emphasize too greatly that we are only half-way through the three-year build-up program. It is true that some of the materials shortages are no longer with us. But this does not mean we should remove controls on all materials. We believe in flexible systems of controls not for its own sake, but to maintain an adequate flow of materials to essential industries."



"Why right now we have only four chemicals under allocation — naphthenic acid, thiokol, methylene chloride and polyethylene. We have already issued some 30 actions relaxing or removing controls over materials.

"And in the over-all program, DPA has increased the amounts of metals which industries can use without specific authorization for maintenance and repair."

"I am still worried over the problem of personnel. We must continue to rotate industry men in mobilization jobs. Many of our present men on loan have served six months plus, and want to return to private business.

"In the past, there has never been a time when the defense effort has been delayed by a chemical shortage. We can keep up this record only by having good men."

Drug Pricing on Trial

Keeping guns trained on "big business" continues to be the order of the day in Truman's Department of Justice, regardless of who is serving as Attorney-General.

On the day that James P. McGranery was sworn in to succeed J. Howard McGrath in that office, the Government followed up its victory in the Du Pont-ICI restraint-of-trade suit by hurling a price-fixing charge at McKesson & Robbins, Inc.

At issue in this new anti-trust civil suit: Whether it's legal to hold dealers to a schedule of minimum resale prices.

The 118-year-old corporation, which last year reported more than $433 million in net sales of drugstore items and chemicals, freely admits that it has been requiring dealers to stick to such a schedule.

No Issue Dodging: Defiantly, Chairman of the Board William J. Murray, Jr., replied to the charge by asserting that McKesson & Robbins "welcomes this suit as a means of determining its right to sell products of its own manufacture to wholesalers and retailers under existing Fair Trade laws."

"The company . . . is protecting brand-name products of its own manufacture against price-cutting by means of contracts which obligate wholesalers and retailers to enter into agreements to re-sell such products at not less than minimum resale price schedules," Murray stated. "The company is convinced of the lawfulness of its position and is prepared to carry the case to the Supreme Court if necessary."

One interpretation of the legal point involved: The Sherman and Miller-Tydings acts forbid minimum price agreements between dealers who compete against each other.

In the present case, the Government names McKesson & Robbins as defendant, then defines as "co-conspirators" numerous wholesalers who allegedly entered into written resale price maintenance contracts covering products manufactured by McKesson. These dealers, according to the complaint, are competitors of the defendant in wholesaling drugstore merchandise.

One of Biggest: The Government's complaint, filed in U.S. District Court in New York, says that McKesson & Robbins is one of the largest wholesalers of drugstore merchandise in the United States. "Operating through more than 70 divisions located in 35 states, it conducts a nation-wide business in drugs, pharmaceuticals, surgical and medical supplies, toilet articles, and sundry other items customarliy sold in drug stores," the complaint goes on.

"Most of the merchandise wholesaled by the defendant consists of products manufactured or supplied by other concerns. The remainder, accounting for annual net sales of about $11,000,000, consists of products manufactured by the defendant at its plant in Connecticut (Hartford) and branded with defendant's name."

Since Last June: "Beginning in or about June 1951, and continuing up to the date of filing of this complaint, the defendant and co-conspirators have engaged in an unlawful combination and conspiracy . . . to fix and control wholesale and retail selling prices of McKesson products, in restraint of interstate trade and commerce therein, and in violation of Section 1 of the Sherman Act," the complaint charged.

Results of this "conspiracy," the Government contends, are that prices have been fixed by private agreement instead of by free competition; dealers wishing to sell McKesson products at lower prices have not been able to buy the goods; and consumers have been prevented from buying McKesson products at non-fixed, lower price levels.

The Court will be asked to enjoin the defendant and its officers and agents from attempting to control prices of McKesson products through private agreements; to cancel all such agreements as may have been made; and to enjoin the company from refusing to sell McKesson products to dealers refusing to abide by a "fixed or suggested" price scale. The Government also hopes the Court will order McKesson & Robbins to pay the legal costs of the Federal Court proceedings.

The company had 20 days to answer the charge, but could apply for more time in which to file a reply. Pending the company's action, no trial date has been set.

COMPANIES . . . .

Florida Petrochemical, which plans to build an oil cracking unit in Fort Lauderdale, Fla. (*CW, May 3*), has run into some legal difficulties. A suit was filed a few days ago to restrain the county port authority from negotiating a lease for the plant site. A fact-finding committee was to be set up to determine whether the plant would emit objectionable and harmful gases, smoke or oily effluent.

•

Owens-Illinois Glass has merged two of its subsidiaries whose markets had been closely related. Its Kimble Glass division will be merged into American Structural Products, which will then change its name to Kimble Glass Co.

•

Celanese has consolidated its textile activities in a textile division, and has set up a market development department to "aggressively promote the use of the company's fibers."

•

Bristol Myers plans public marketing of $5 million in debentures due 1977 and sale of 200,000 shares of common stock to present stockholders. Rights to buy one share would be given for every seven held.

• A secondary offering of 10,000 shares of Alcoa stock at $76, made in New York last week was oversubscribed.

EXPANSION . . .

Busy Underground

Beryl and other pegmatite deposits near Andover, Me., are being developed by Beryllium Development, a subsidiary of Beryllium Corp. (Reading, Pa.)

The Defense Minerals Exploration Administration has certified several new strategic mineral deposits on which it will pay part of the exploration costs:

• A new monazite deposit has been found on the holdings of the Ruby Meadows Mining Co., Idaho County, Idaho.

• Sulfur has been found in Park County, Wyo., on the property of Consolidated Sulphur and Phosphate Corp.

• Tungsten ore was discovered in Beaverhead County, Mont., on lands owned by American Alloys Metal.

• Mica has been found near Franklin, North Carolina, and near Custer, South Dakota.

•

Zirconium; Hafnium: The Atomic Energy Commission has signed a contract with a new Carborundum Co. subsidiary (Carborundum Metals) for the sale of about 150,000 pounds of zirconium and hafnium sponge metal yearly. Carborundum will use the iodide reduction method developed by the Bureau of Mines in a $2.5 million Cincinnati plant. Previously AEC met its needs for the corrosion-resistant, low neutron-absorbing zirconium metal in government-owned facilities at Oak Ridge and at Albany, Ore.

BUSINESS & INDUSTRY . . . . . .

Lithium Chemicals: Foote Mineral will spend about $3 million in expanding lithium production.

It has purchased mining rights to 37 acres adjoining its Kings Mountain, N.C., spodumene mine, where it will install additional processing equipment.

Foote will erect limestone quarrying and processing facilities in Virginia.

It will build integrated lithium chemical production facilities at Sunbright, Va. All raw materials processed there will either be mined by Foote or will be by-products of other company operations.

•

Furfuryl Alcohol: Quaker Oats will start construction late this year on a $600,000 furfuryl alcohol plant at Memphis, Tenn. The company plans to use a new continuous process hydrogenation, using hydrogen from Velsicol's chlorine operations. Completion is scheduled by mid-1953.

• Quaker does not plan to add further furfural capacity to meet the needs of the plant.

•

LABOR . . . . . .

Solvay Guilty: A trial examiner's report that the Solvay Division, Allied Chemical & Dye Corp., engaged in unfair labor practices at its East Ashland, Ky. plant has been affirmed by NLRB.

Solvay has been directed to follow the trial examiner's recommendations to remedy its treatment of employees looking into the advantages of joining the Gas, Coke & Chemical Workers (CIO).

•

Back to Work: Standard of Indiana's Whiting refinery is back in full production this week, its strike settled. Local 100, Central States Petroleum Union, signed up for the widely accepted raise of 15¢-an-hour, 9¢ retroactive to December 1, 1951. Shift differentials of 6¢ and 12¢ an hour were also included.

•

Take Cover: Now they're shooting down in McIntosh, Ala., where labor trouble is bubbling around the plant being built for the Geigy Chemical Co. Seems somebody has been shooting at AFL Mobile Building Trades Council pickets. The union wants it stopped, threatens to call on Gov. Gordon Persons to intervene.

No one is on strike at Geigy—the workers are non-union. The trouble is just that; the union wants the contractor to sign a union contract, the contractor is reluctant, and the union is picketing. Up to now there have been several clashes between the workers and the pickets, and the county sheriff threatened to call on the Governor to use the National Guard early in the fracas. Now, with gunfire involved, the Governor-hollering shoe is on the other foot.

•

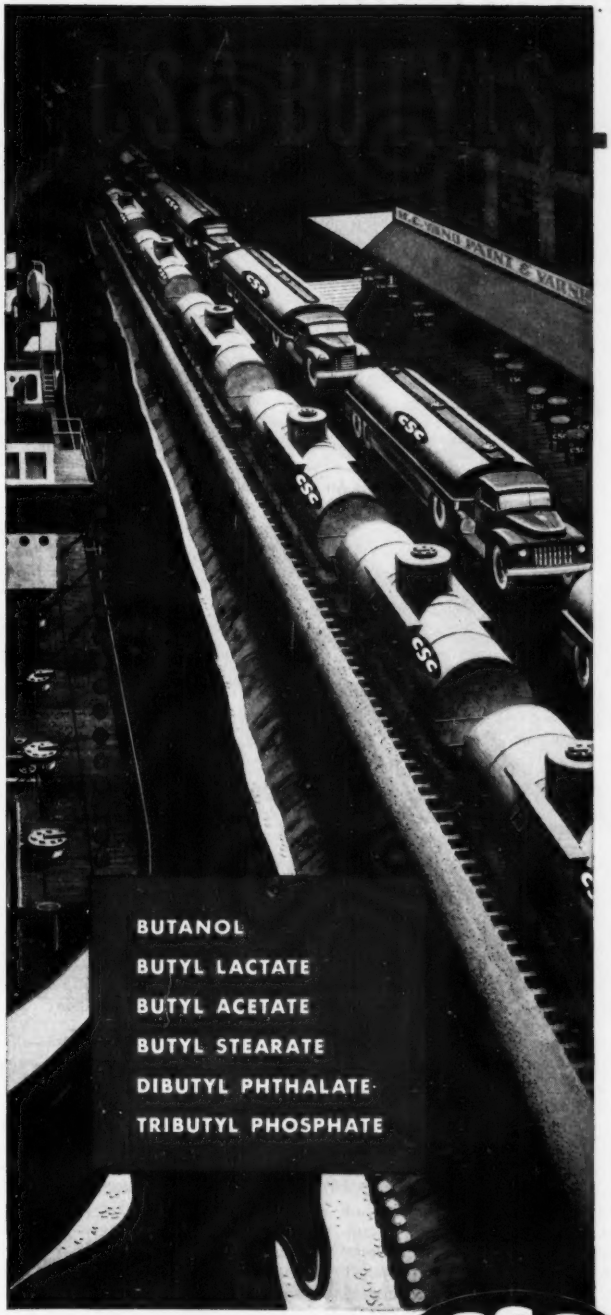
Next Round: Solvay Division, Allied Chemical & Dye Corp., officials in Syracuse, N.Y., are a little on edge awaiting the opening of the first contract negotiations this month with District 50-UMW (Ind.) since the bitter nationwide strike of two years ago.

•

Union Complains: Local 306, International Chemical Workers (AFL), has filed unfair labor practices charges against the Ansco Division, General Aniline & Film, plant at Binghamton, N. Y. Apparently the company discharged three men for "insubordination," which the union claims was not so. The union maintains the men were fired without "good and sufficient cause," wants them reinstated with lost-time pay.

CURRENT LIST OF DPA-CERTIFIED FACILITIES

Company, Location	Product	Amount Certified	% Certified
Stanolind Oil & Gas, North Cowden field, near Midland, Tex.	Sulfur	$ 202,000	70
Dow Chemical, Midland, Mich.	Bromine brine wells	122,056	50
Industrial Air Products, Pascagoula, Miss.	Oxygen, nitrogen	207,668	55
Marks Oxygen, Augusta, Ga.	Oxygen, acetylene	178,000	50
Home Oxygen, Billings, Mont.	Oxygen	182,367	50
Cabot Carbon, St. Mary parish (county), La.	Carbon black	1,847,080	50
Cabot Carbon, Centerville, La.	Carbon black	1,097,475	50
Continental Carbon, near Sunray, Tex.	Carbon black	185,000	50
Continental Carbon, near Hobbs, N.M.	Carbon black	1,010,500	50
United Carbon, St. Mary parish, La.	Carbon black	2,655,500	50
United Carbon, near Wheeler, Tex.	Carbon black	1,907,500	50
Phillips Chemical, Borger, Tex.	Carbon black	2,395,900 479,500	50 50
Thermatomic Carbon, Sterlington, La.	Carbon black	985,110 198,500	50 50
Davison Chemical, Curtis Bay, Baltimore, Md.	Silica gel	315,703	45
Reynolds Metal, Colbert county, Ala.	Cryolite	155,650	70
Ohio Hydrate & Supply, Woodville, Ohio	Dolomite	52,500	40
Carborundum, Cincinnati, Ohio	Zirconium, hafnium	2,443,000	85
Westmoreland Manganese, Batesville, Ark.	Manganese	2,313,590	65
Eagle Picher, Joplin, Mo.	Germanium	22,850	70
American Zinc of Ill., Fairmont City, Ill.	Germanium oxide	90,000	70
U.S. Steel, Clairton, Pa.	Coke, coal chemicals	12,570,000	45
American Steel & Wire of N.J., Cleveland, Ohio	Coke, coal chemicals	1,450,000	45
American Steel & Wire, Duluth, Minn.	Coke, coal chemicals	7,280,000	50
Alabama By-Products Corp., Tarrant, Ala.	Metallurgical coke	1,177,800	50
Allied Chemical & Dye, Semet Solvay div., Ironton, Ohio	Coke	1,325,000	50
Allied Chemical & Dye, Hopewell, Va.	Methanol, formaldehyde	11,900,000	45
Commercial Solvents, Peoria, Ill.	Formaldehyde	385,000	55
Union Carbide & Carbon, Texas City, Tex.	Oxygen, methanol	9,040,360	50
Gulf Oil, Port Arthur, Tex.	Ethylene	585,800	60
Gulf Oil, Philadelphia, Pa.	Propane, propylene	229,383	65
Columbia Southern, Barberton, Ohio	Perchlorethylene	243,000	50
Union Oil of Calif., Wilmington, Calif.	Benzene, toluene	2,950,000 6,663,000 2,387,000	45 65 90
Tennessee Products & Chem., Chattanooga, Tenn.	Lindane, trichlorobenzene	217,132	45
Ethyl Corp., Baton Rouge, La.	Lindane	2,815,000	45
Shell Chemical, Houston, Tex.	Epon resins	4,063,000 472,900 226,100	50 45 15
Continental Oil, Ponca City, Okla	Lube oil additives	326,310 388,942 328,219 645,640	65 50 40 15
Nuodex Products, Newark, N.J.	Aluminum soap	77,895	55
Celanese Corp., Belvidere, N.J.	Plastic films	1,144,000	60
Celanese Corp., Newark, N.J.	Plastic sheet	403,000	60
Dow Chemical, Midland, Mich.	Chemicals	5,226,300	45
New York Quinine & Chem., Newark, N.J.	Opium derivs.	313,885	60



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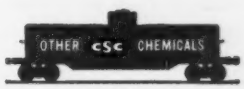

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OUTSIDE HANOVER FAIR: Air of prosperity, pride in recovery.

HALL OF CHEMISTRY: Some "old stuff," but the heart of the show.

Proof of Postwar German Resurgence

Many of the products at the exhibit of the German chemical industry at the 1952 German Technical Fair, Hanover, concluded last month, were old stuff to American visitors, novelties only to the German public. But the prosperous appearance of attending industrialists, the slick, modern exhibits with much of dollar-interest to U.S. as well as German chemical businessmen, gave conclusive proof of this fact: Postwar "chemical" Germany is a going concern.

Though German exhibitors were quick to say, "Don't consider this a purely German development; it's based on years of American research," etc., they pointed proudly to the chemical industry's economic achievements:

Sales amounting to 9.9 billion Deutsche Mark in 1951, a 40% increase over 1950. Production index (1936=100) now standing at 140. And the industry again employing roughly 310,000 workers in West Germany.

Production rose strongly in three chemical groups during 1951. Plastics rose from 80,000 tons in 1950 to 170,000 tons in 1951. Synthetic fibers registered an increase of 24,000 tons last year, with total production at 184,000 tons. Pharmaceuticals production value hit DM 700 million, compared with DM 550 million in 1950.

New or improved products and equipment, however, are the lifeblood of any industrial show. And these are

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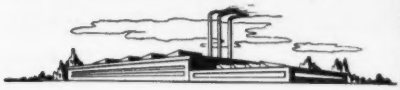

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With Sparkler horizontal plates there is no tensile strain on the cake. Even a very thin cake can be built up without danger of slipping or breaking as it rests in a horizontal position on the plate and requires no pressure to hold it in position. This saves considerable cost in pre-coating.

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what made the Hall of Chemistry tick for visitors to the Hanover Fair:

Alkyd Resin WM (Anorgana, Gendorf), product for making pure white, highly elastic, water- and weather-resistant urea-melamine formulations. The material will not turn yellow and can stand temperatures above 180 C.

Fixapret CP Liquid (Badische Anilin und Soda Fabriken, Ludwigshafen), a textile agent that gives cotton laundry-proof "chintz quality," enables rayon to receive printing and moire effects that are water-resistant.

Urecoll K (also BASF), synthetic resin added to paper pulp in beater to impart wet strength to wrapping paper.

Styropor (also BASF), polystyrene of micro-porous, foam-like structure, with excellent water-resistant and insulating characteristics, low specific gravity. Applications: refrigerator insulation, buoys, floats, etc.

Desmodur - Desmophen (Farben-Fabriken Bayer-Leverkusen), material for high-quality, special lacquers, and for processing foam materials.

Desmodur R, resin for rubber-metal and rubber-textile bonds.

Vulkollan (also Bayer-Leverkusen), new elastic material for packings, gaskets, siphon mebranes.

Renacit and "4000" (both Bayer), rubber processing aids; the latter counteracts aging.

PF-Bayer-Plastic (Bayer), a "successful further development of Teflon-type plastic," which is stable to temperatures of wide range, is extremely resistant to most acids, can be shaped into foils of any desired thickness.

KS-Binder (Bayer), new silica-based binder that withstands temperatures up to 1000 C., useful in insulation-materials industry, particularly asbestos.

Resin Tan (Casella Werke, Frankfurt), new material for processing white leather.

Fibrit (Deutsche Fibrit Gesellschaft, Krefeld), new wrapping materials of polyvinyl and polyethylene films.

Trovidur (Dynamit A. G. Troisdorf), polyvinyl chloride-based material marketed in shape of semi-finished goods, has excellent corrosion resistance, aging and electrical properties.

H3G Suprafix (Farbwerke Hoechst, Frankfurt), vivid green, fast dye for cotton, artificial fibers.

Anthracyaninviolet 3 R (Hoechst), dye that is applicable to Perlon.

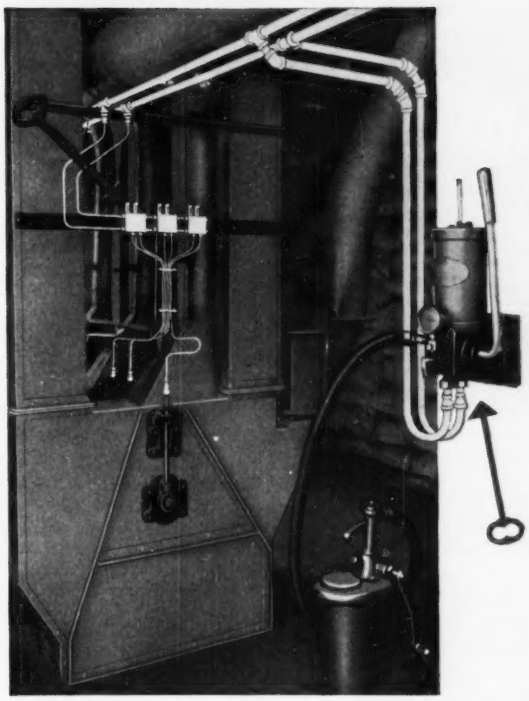
Vinarol ST (Hoechst), thickening substance for printing Lanaperl and vat dyestuffs on Perlon.

Hostaflon (Hoechst), polytrifluorochlorethylene plastic finding application as membrane in instruments.

Schallschluck 163 (Dr. Stankiewicz,

FARVAL—*Studies in Centralized Lubrication* No. 134

Farval insures cleanliness and safety in flour mill lubrication



KEYS TO ADEQUATE LUBRICATION—*Whenever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.*

IN any mill or grain elevator, leaky bearings are always a problem. Dripping oil may contaminate grain and flour. Oilers must spend extra time putting in "just the right amount" of oil and grease. In short, old-fashioned lubrication methods are obsolete—time consuming, dangerous and expensive.

One large flour mill solved this problem permanently with Farval Centralized Lubrication. To serve a total of 1199 bearings on 12 floors, 28 manual Farval systems were installed. Now three men, winter and summer, handle all lubrication—replacing 13 men who formerly applied oil and grease by hand. A saving of ten men's time! Oil is saved, employee safety is insured, product is protected and bearing replacements reduced to a minimum.

Farval is the economical, dependable method of lubricating the hundreds of bearings on equipment in every elevator and flour mill—on bucket elevators, lofter legs, belt and screw conveyors, shafts, rolls, pulleys and idlers, scourers, separators, conditioners, mills, sifters, and packers.

Farval is a practical system proved in 25 years of service. It is in widespread use throughout industry. Even the oldest mills and elevators can use Farval with profit. It is simple and easy to install on equipment, new or old, at any time. Savings effected soon pay for the system.

Get the whole story of Farval by writing for Bulletin 25. The Farval Corporation, 3291 E. 80th St., Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

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As rubber mold lubricants they give quick, clean release from the mold and impart an attractive finish to the rubber. And they burn out almost completely during the fabricating cycle without excessive carbon build-up.

In textile processing sizes, their lubricating and softening action gives the size pliability and lubricity. As a finishing size CARBOWAX compounds impart a soft "hand" to cotton and viscose and acetate rayon.

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Besides their lubricating action and water-solubility, CARBOWAX compounds have the advantage of being white in color, bland and non-irritating to the skin, and solvents for many medicaments. These properties have made them popular as ointment bases for drugs and cosmetics. Their water-solubility insures effective action by the medicaments and complete coverage of tissue areas, as well as easy removal.

In cosmetic creams and lotions, CARBOWAX compounds impart skin-smoothing properties without a moist or tacky feeling and can be removed easily between applications.

Other uses of these unusual products include: metal extrusion operations, lubricants and humectants in steam-set inks, water-soluble bases for decalcomanias, plasticizers in adhesives, solvents in fire-fighting foams, binders for ceramic colors, additives in tin-plating solutions, and intermediates for the preparation of non-ionic surface-active agents and resins.

CARBOWAX *compounds are available for immediate shipment in commercial quantities. For samples and further information call or write the nearest of CARBIDE's 21 offices.*

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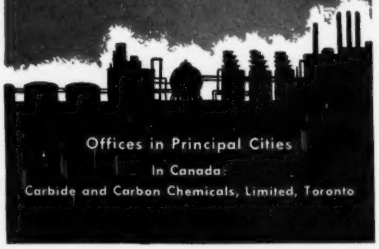

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The term "Carbowax" is a registered trade-mark of Union Carbide and Carbon Corporation.

Celle/Han.), new plastic with sound-absorbing qualities available in water suspension for spray application. Expected outlets: industries where large metal parts have to be made sound-absorbent, as air conditioning, metal pre-fab houses, superstructures of ships, etc.

Hygrometer (Riedel-de Haen A. G. Seelze/Han.) new type operating on calcium carbide method gives determination with high degree of accuracy in a few minutes. Suitable for determining moisture in floors, ceilings, masonry, etc.

Mounting Challenge

"Industrial wastes polluting our natural waters and atmosphere are a rapidly mounting challenge to all . . . industrial managers . . ." This growing theme was in the news again last week as public health experts gathered at the University of Florida for their annual conference.

Keynoting the session was a strong emphasis on the dollars and cents value of effective pollution control, as well as the dividend in community peace.

Said L. A. Young of the U.S. Public Health Service, "Industry, always alert . . . to the value of public good will, is beginning to recognize the capital worth of an active program of industrial pollution control."

To back up this statement are such figures as the recovery of 2½ billion pounds of citrus waste for cattle feed each year, and the saving of several hundred dollars a day by recovering animal fats formerly discharged in waste.

Danger in Dixie: Concentrating largely on the problems of the South, the health experts pointed out that pollution control is becoming more complex there since many chemical processing plants have arrived in the area.

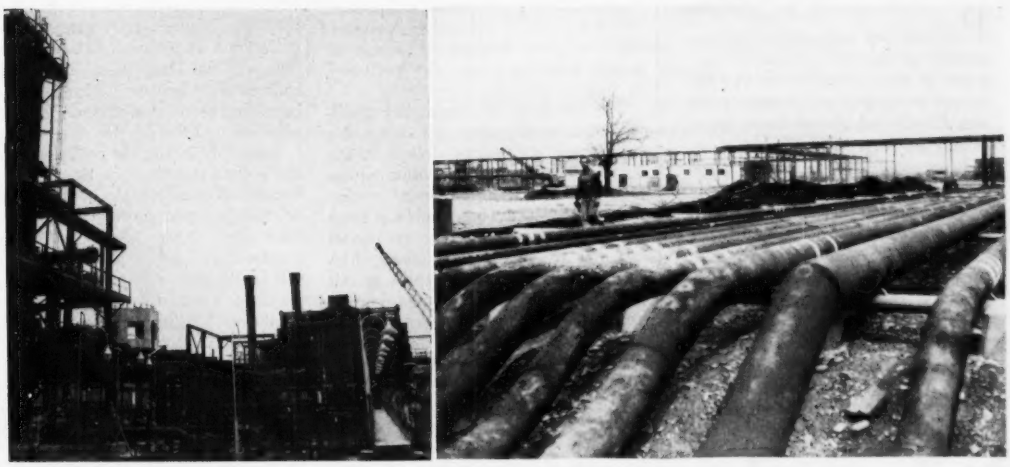
Ironically, one of the major attractions for industry in the South is the good water, which now is in danger from industry itself.

Two of the South's major industries came in for a lot of attention. The phosphate industry, processing about 80% of the U.S. supply and 70% of the entire world's, has been under fire many times for stream pollution, but is given an almost completely clean bill of health by the experts. The industry has had a thorough going-over by the State Board of Health, came out with flying colors. In fact, the report showed that phosphate waste tends to stimulate aquatic plant growth, providing food and hiding places for fish, oxygen for the water. The only danger comes if the plant growth gets too thick and chokes the stream.

The wood products industry does not come off quite so well. Much has been done to reduce the pollution from pulp and paper mills, turpentine stills, etc., but a lot remains to be achieved. The State of Florida has made an extensive study of the whole industry's waste problem and has come up with recommendations for new processes, special chemical methods of treatment, and physical methods, such as flotation. The industry itself has set up a project at Louisiana State University for finding suitable methods to treat kraft effluents.

Biological Treatment: Much attention was given to the possibilities of biological stabilization of organic wastes, particularly chemical. One speaker pointed out that he had found it entirely possible to develop species of organisms which can stabilize organic wastes which would normally upset a treatment plant which handles only domestic sewage. Even toxic wastes such as phenolics can be treated biologically. The use of trickling filters and activated sludges to stabilize industrial organic wastes was found to be both technically and economically feasible.

Now or Else: Sounding the tocsin for both industrialists and public health officials, J. W. Wakefield, chief of the sewage and industrial wastes section of the health board, cited strongly the importance of tackling the waste problem before many more states get into the position of such long-industrialized states as Pennsylvania, where industries, municipalities and the states are spending millions to recover lost stream resources. Industry in particular must beware lest the situation deteriorate to the point where it is itself seriously and expensively affected through upstream pollution of its own vital water supply.



American Technology Makes Gasoline in Italy

TWO NEW REFINERIES in the center of Northern Italy, run by technicians of E. B. Badger & Sons, New York, depend on crude oil carried in the longest pipelines in Europe, across mountains and under rivers, from tankers unloading at the Italian Riviera, near Savona, about 100 miles away. One is under construction at San Martino di Trecate (here pictured) near Novara; the other at Pantanedo di Rho, about 13 miles from Milan. The whole operation has been financed half by Italian, half by American capital. Production from the refineries is calculated at over 1½ million tons of gasoline a year.

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Smells in the Suburbs

Would the fragrant aromas of Kentucky bluegrass, burley and bourbon be tainted by the air from a dry-mix factory for inorganic fertilizer? Pondering on that pungent question this week were members of Louisville's Planning and Zoning Commission. The Co-operative Fertilizer Service of Richmond, Va., has applied for permission to erect such a plant south of Standiford Field in the Louisville suburbs. More than 65 residents of that neighborhood opposed the idea with this succinct comment: "It stinks!"

However, assurance to the contrary was forthcoming from Robert P. Hobson, attorney for the company, and from Grayson Morris, operations manager.

"Our factory will be attractively built and maintained," Hobson told the commission. "It will not give off any odors. There will be no dust hazard, and no refuse or chemicals that could possibly affect the neighboring lands."

Morris said there would be no sulfuric acid operations, which he termed the usual source of complaints about smells, and promised that all operations would be enclosed.

Perfume, Too: This community squabble flared up in the country-wide friction between chemical processors on the one hand and householders on the other. Industry wants to get along with its townspeople, but can't afford expensive "pampering"; what a community seems to want, processors say, is "perfume" as well as payrolls.

For the sake of community goodwill and health, chemical companies have spent millions of dollars in the six post-war years on elaborate equipment to control or eliminate smoke, fumes and dusts. One result has been that the public has come to expect factories to be odorless; many cities now have complex ordinances on air pollution. Most companies now figure on anti-contamination devices in estimating capital outlay for new plants. Good community relations are a must, but pollution control often takes time, a fact irate citizens overlook.

Industrial Zone: The fertilizer co-operative's proposed 15-acre site near Louisville is next door to a concrete-pipe factory in a district already zoned for heavy industry, Hobson pointed out. He said the company already has several plants in the South, including a wet-mix plant in Winchester, Ky.

Louisville allows most new industries to set up shop in heavy-industry zones with little formality, but the planning commission is required to hold a public hearing before it okays chemical plants—particularly those for carbide and fertilizer.

Leading the irate suburbanites in opposition at the recent hearing were determined Joseph Stevenson and Mrs. William Hemingway.

"I was raised around fertilizer, and I know what it smells like," Stevenson declared. "No filter in the world can stop that smell."

More tactfully, Mrs. Hemingway simply said: "We would much rather have homes over there."

The commission said it would sit tight until its staff investigators could sample the odors and opinions around fertilizer factories already operating in Kentucky.

Stack Strews Trouble

Running a steel plant in an agriculture area can cost $5 million more than meets the eye. United States Steel Corp. found that out this month when its initial report on a research project indicated a definite link between Geneva, Utah, stack discharges and a number of cases of fluorine poisoning in Utah County dairy cattle. The $5 million represents the amount engineers, who term the Geneva problem "unique in steel-making history," fear it may take to protect herds and orchards against fluoride discharges. USS has already spent $350,000 on the year-long research program just completed by Stanford Research Institute and the Utah State Agricultural College Experiment Station, is now installing corrective devices to eliminate much of the fluorine discharge.

Cause of the fluorine pollution problem is the heretofore unsuspected high fluorine content of Utah-mined ores. All standard precautions against stack discharges were taken in original construction and expansions of the war-built Geneva plant, but they apparently were not enough for this operation. Design and installation of new and complete safeguards will be time-consuming and costly.

Higher by Far: According to studies now being completed, ores from Utah's Iron County mines (used by Colorado Fuel & Iron at Pueblo, Colo., by Kaiser Mills at Fontana, and at Columbia steel properties in California as well as by Geneva) contain 435 parts of fluorine to every one part present in the Mesabi Range ores. Loren J. Westhaver, vice-president and general manager of the Geneva plant operation, points out

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BASIC MANUFACTURERS OF INDUSTRIAL, PHARMACEUTICAL, AND AGRICULTURAL CHEMICALS

that although "corrective devices have been carefully studied and their applications to the Geneva plant tested," new devices—particularly for Geneva's sintering plant—must be developed; previously known installations are not applicable in design or detail.

Final installation of 100% corrective equipment can't be expected before 1954. However, the studies made thus far show that the discharges can be controlled, and a program now under way will bring about a very marked decrease in fluoride poisoning in the near future.

This poisoning—fluorosis — causes crippling enlargement of bone joints of the animals, and their teeth become enlarged, mottled and so painful that normal drinking or grazing is impossible.

Significantly, when cows in the area developed these symptoms and state college scientists put the blame on ingestion of too much fluorine, U.S. Steel developed a mutually cooperative program with the dairymen concerned. The company has employed Dr. F. N. Mortenson, a widely known agricultural expert, to direct a survey of the damaged herds and farms, and has assured that proper payments for damages will be made regardless of legal responsibility involved.

Hammers Fly Again

Work on new construction projects at nine large chemical plants on the Texas Gulf Coast resumed when wage increases of 17 and 20 cents an hour ended a 44-day strike by AFL construction workers.

Expansion programs affected were those at Du Pont's Sabine River plant at Orange, Texas; Koppers and Gulf Refining at Port Arthur; Pure Oil at Nederland; Magnolia Petroleum at Beaumont; and Neches Butane Products, B. F. Goodrich Chemical, U. S. Rubber and Jefferson Chemical at Port Neches.

The wage increases, offered by contractors banded together in the Sabine Area Construction Committee, will be retroactive to May 1, providing that WSB approves the one-year contract. New wage rates are $2.57½ an hour for heavy duty operating engineers, up from $2.37½, and $2.17½ for light duty workmen, up from an even $2.

Lines Honored: Many hundred AFL craftsmen refused to cross the picket lines maintained by Operating Engineers Union, Local 450, during the strike. The stoppage ended when the union's members voted to accept terms offered by the contractors, with pay scales equal to those in a recent agreement with the Associated Gen-

Chemical Progress

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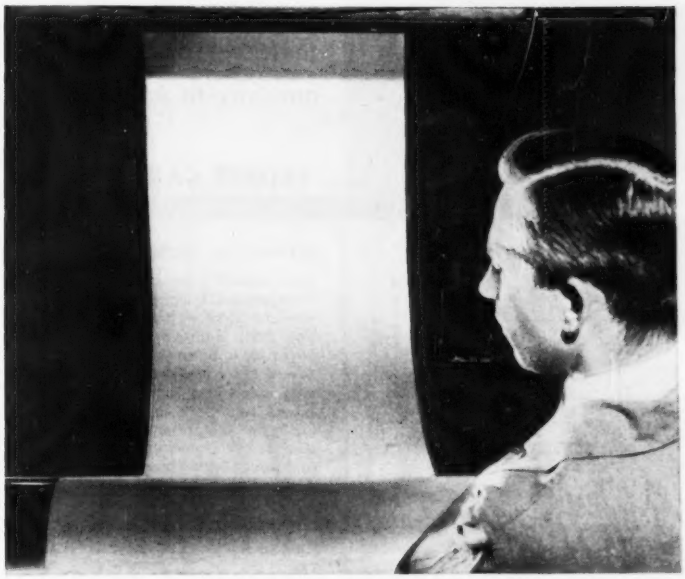
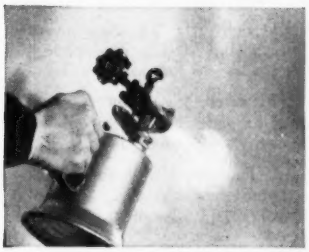
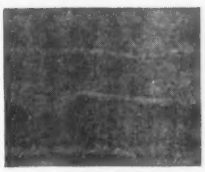


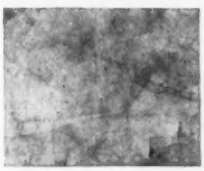
Continuous G-E mica mat sheet emerges from machine which forms minute mica flakes into flexible rolls of highly uniform mica insulation.



Blowtorch test *indicates the high temperature resistance of G-E mica mat, which can be heated red-hot without damage.*



Greater uniformity *of new G-E mica mat (above right) is shown in contrast to conventional mica insulating sheet (right).*



Here's the newest product of General Electric chemical research —*mica in continuous sheet form!* This development, which permits the use of low-grade domestic mica for electrical insulation, may free our mica industry from dependence on foreign sources and alleviate a serious shortage threat to the electrical industry.

G-E mica mat is 100% mica in the form of flakes and particles in continuous sheets. It gives better performance than present machine- and hand-laid mica products because of its greater uniformity of thickness and its void-free construction.

Capable of being impregnated with resins and bonded to paper, glass or cloth for greater strength and improved electrical properties, G-E mica mat tapes and sheets can be used in heating devices, molded into shapes for motors and generators, or machine-wrapped on bars and cable.

For a complete technical report on G-E mica mat, write to General Electric Company, Chemical Division, Pittsfield 13, Massachusetts.

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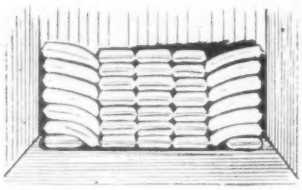
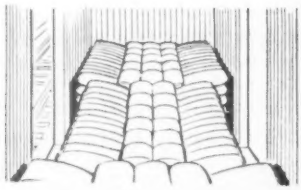
PROPER CAR LOADING

PREPARATION IS IMPORTANT

Cars should be clean, dry, and free from protruding nails or other projections. Remove all dirt, dust, rocks and grit. Remove loose nails and cover loose bolts with cardboard or several thicknesses of car liner. (Picture shows how to use straight-edge board to locate protruding nails, etc.). Cover floor (and walls, if necessary) with good grade of car liner and put at least three thicknesses on door edges. Use asphalt-laminated paper to seal door cracks.





FOLLOW THESE LOADING RULES:

1 The car should be loaded so that the filled bags will not come in contact with side doors. **a.** Use a good grade of dunnage in the doorway or steel strapping covered with corrugated board. **b.** Follow proper loading patterns. (Illustrated.) **c.** Use retaining strips of special Scotch tape applied across the load, or steel retaining straps covered by one thickness of corrugated board.

2 Bags should be loaded tightly, solidly and flat, to minimize shifting.

3 Balance the load from end to end and side to side. There are, in general, three loading methods—crosswise, brickwall and lengthwise. Crosswise is generally preferred. Loading in car doorways should be done so that this part of the load acts as a keystone between the end loads. (See illustration.)

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eral Contractors. Also involved were several changes in working conditions.

In a joint statement, A. E. Dishman of the contractors and A. J. Flowers of Local 450 said the agreement was reached "only after both parties . . . made major concessions."

KEY CHANGES . .

E. L. Oliver, Jr.: To executive vice president, Oliver United Filters Inc.

Max Key: To vice president, Asahi-Dow Ltd. He is assistant production manager, saran dept., Dow Chemical Co.

Gloyd M. Wiles: To vice president and general manager, Nickel Processing Corp.

W. Kenneth Menke: To vice president in charge of chemicals, Pittsburgh Coke & Chemical Co.

Harrison C. Blankmeyer: To scientific director, research and development labs., Owens-Corning Fiberglas Corp.

Carl C. Mattmann: To director of fabric development, fiber div., Virginia-Carolina Chemical Corp.

Freidrich Schwarz: To director of mechanical and design engineering, Radiation Counter Laboratories, Inc.

Loring F. Coes, Jr.: From research engineer to assistant director of research and development, Norton Co.

George B. Hamilton: To general manager, amino products div., International Minerals & Chemical Corp.

Paul F. Swanson: To manager, process engineering dept., M. W. Kellogg Co.

Laurence T. Eck: To plant manager, cobalt metal refinery, National Lead Co.

Neil S. Kocher: To manager, film manufacturing, Eastman Kodak Co.

Charles H. Parcells: To supervisor of labor relations, United States Rubber Co.

D. B. Craver: To general manager of sales, American Can Co.

Harold A. Krueger: To manager, St. Louis smelting and refining div., National Lead Co.

Ralph J. Holtschlag: To operating superintendent, John F. Queeny plant, Monsanto Chemical Co.

Robert D. Gray: To superintendent, chemical hydrides div., Metal Hydrides, Inc.

Donald C. Osking: To assistant manager of sales, Westvaco Chemical Div.

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RDB CHAIRMAN WHITMAN: Taking the uncertainty out of a tricky job.

Pegging Researcher Costs

A just-completed Defense Department survey points up the cost of researchers in government and industry.

Results encompass the broad field of research, aren't easily applied to specific situations.

But a more detailed industry-by-industry survey of researcher costs is now in the works.

The annual task of forecasting research costs for budget purposes is not approached with relish by the greater part of research management. At best, it's a tricky job. But it's one job that is vital to the smooth operation of any research program, whether it be in industry, government or the universities.

Reducing the uncertainty inherent in this endeavor is the aim of the Defense Department's Research and Development Board (RDB). RDB queried 149 organizations supporting research in the hope of discovering just how much it costs to keep a researcher on the job.

Included in the canvassed group were 42 industrial firms, 56 Federal research and development organizations and 51 universities and nonprofit institutions. Combined, they employ about 30% of the nation's research force.

From a preliminary study of its data RDB finds that the average annual cost per industrial research worker (including technicians and auxiliary personnel) is $8,500. Per engineer or scientist, cost skyrockets to an average of $20,100 a year.

By research worker RDB means all individuals participating directly in research and development activities as scientists or engineers; technical assistants; administrative, clerical or maintenance personnel. Engineers and scientists, in RDB terminology, are research staffers with at least a bachelor degree or the equivalent who are actively engaged in some phase of their profession.

Costs, according to RDB, are the direct and indirect expenses of research and development.

In practice, the RDB figures are arrived at in this way: for cost per research worker, the total annual research and development budget is divided by the total man-years of all research personnel; the same total annual cost divided by man-years of engineers and scientists gives the cost per engineer and scientist.

Applying these calculations to Federal government, the average cost per research worker comes to $5,500; based on engineers and scientists, it averages $22,800.

Complications: Universities and non-profit organizations complicate the estimate since graduate students normally play a major role in their research activities. But, on the basis of paid employees only, the average cost per engineer and scientist in these institutions runs to $8,900.

Because of marked discrepancies in the cost per researcher and per engineer and scientist among different laboratories, RDB's current results won't be of much help to research directors wrestling with a budget.

For example, accounting practices vary widely between different industrial and government organizations. So do costs associated with different fields of research and different stages of development.

Robert Zalkin and Kenneth S. Colmen of RDB's Resources Div., architects of the survey, recognize that their figures cannot be applied to individual cases. But they now are busily collecting a wealth of new data which should correct this situation.

But, if they do nothing else, RDB's cost figures certainly highlight a somewhat surprising difference in the average cost per engineer and scientist to industry and government. Lest some be alarmed, the higher government figure is not evidence of a free-and-easy spending policy. It's mainly a matter of ratios: in private industry more than 40% of all researchers are engineers and scientists; in the Federal government, 25% is about par.

RDB found industry responsive to its survey questionnaires, is well-satisfied with results. The survey just completed is more a trial run than an end in itself. A more ambitious project is now in the works.

In the hope of developing practical data on the working levels of research economics, RDB staffers are working up a new and expanded store of industrial information. Zalkin believes the new information will enable them to determine average expenditures per researcher, in different size companies, in each of some forty industries.

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Research, Part of the Team

The value of research to an industrial organization is obvious. But the complete function of research in a company is seldom fully appreciated. Paul D. V. Manning, vice-president in charge of research, International Minerals & Chemical Corp., addressing a group of industrial researchers in New York City, recently pointed up the responsibilities of research to the commercial business.

According to Manning, research is part of the team—a partner of promotion and selling.

Research workers should never lose sight of that fact and ridicule or belittle, as purely mercenary, the commercial side of selling the product they make possible. To drive his point home, Manning states: "It is well . . . to remember that the realization of the purpose of every commercial enterprise depends finally upon selling.

"There is no reason for industrial research unless its results are translated into the production of something that can be sold."

Partnership the Ideal: The ideal is a partnership between research, promotion and sales. And research has a good deal to gain from such an arrangement. It's important, in Manning's view, that research recognize the sales group as a major source of ideas upon which projects of great potential value can be based.

But Manning feels that too often ideas originating with sales are not received as enthusiastically as their merit would warrant.

Moreover, cooperation with the promotion end of the business is highly desirable, frequently neglected. The reason for this state of affairs appears to be a conflict in points of view. Says Manning: "The scientist tries to develop objectivity in his thinking. . . . The promotion men try always to make their statements . . . develop a subjective interest in the ones whom they are trying to sell.

"Although at first glance these two viewpoints appear to be incompatible, they are not necessarily so. The highest type of sales appeal results when the scientific truths developed by research are set up in such a way that they become subjectively interesting to the potential customer.

"The attitude of the research man should not be one of ridicule, but rather of endeavoring to guide the promotion man in the use of research results in a proper manner to excite subjective interest on the part of those to whom the promotion is directed.

Objection Overruled: "There are very few products of industrial research that cannot be used to better people's lives. If this is so, why should the research worker object to having them advertised? The trouble," in Manning's opinion, "is that there is too little cooperation between the promotion men and members of the research staff."

When cooperation does exist, however, results are often gratifying. Manning reveals: "In at least one company we noted that the promotion man charged with developing advertising copy sits down in the office of the research director and discusses requirements for a particular ad.

"He then develops the rough copy and returns for another informal conference, seeking constructive criticism. The advertising of that corporation is live and interesting. The highest form of advertising is simple, factual and stimulating to the imagination of the reader. . . . Advertising can be just as creative as research but very frequently is not."

The formula, then, is direct and frequent contact between sales, promotion, public relations and research. Manning opines: "That's effective cooperation in attaining the objectives of the management team—the profitable operation of the industrial business."

•

Versatile Monomer: Trial-lot quantities of acrylamide, American Cyanamid Co.'s newest acrylic monomer are now available. A crystalline product, acrylamide is easy to polymerize and copolymerize, keeps well in storage.

According to Cyanamid, potential applications for polymers and copolymers of the material are in the manufacture of adhesives, dispersing agents, thickening agents, surface coatings, synthetic leathers and rubbers, and finishing agents for paper and textiles.

But the monomer should prove especially interesting to synthetic fiber producers. Modification of acrylonitrile fibers, by the incorporation of acrylamide, is supposed to increase affinity for acid dyes.

The general chemical reactivity of acrylamide further suggests a number of uses in the role of an organic intermediate. The monomer's double bond permits the addition of compounds like alcohols, amines, mercaptans and dienes. And it's reactive to formaldehyde, forming methylolacrylamide or methylenebisacrylamide.

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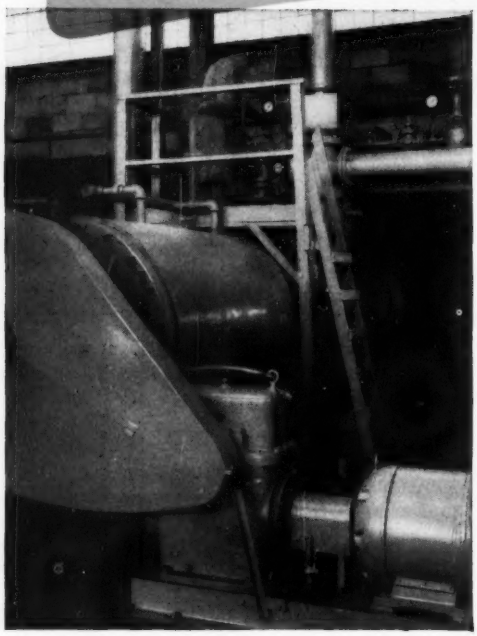


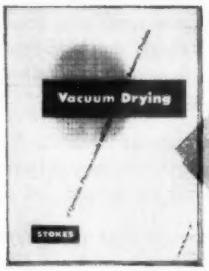
Stokes Rotary Vacuum Dryer at Hooker Electrochemical Co., Niagara Falls, N. Y.

Only by processing under vacuum at low temperature can heat-sensitive materials be dried without destroying all or part of their desired properties.

Hooker Electrochemical Company, Niagara Falls, N.Y., makes a highly heat-sensitive chemical product, first produced in a semi-liquid state with 35% moisture content. The material is uniformly dried in large batches of three or four tons to 0.1% in Stokes Rotary Vacuum Dryers. Vacuum of 1½" Hg. Abs. is maintained from 8 to 12 hours. Weight of the material is reduced from 62 to 52 pounds per cubic foot. Properties of the material remain unchanged.

Fast, thorough, economical drying of many products in large batches, with a minimum of labor, is characteristic of rotary vacuum drying. Water or other solvents are dried from wetted solids at temperatures as low as 100° F. Solvents are recovered at 99%, or better, which often pays for the equipment in as little as six months.

Stokes is the only manufacturer of complete vacuum processing systems. Stokes Advisory Service and testing facilities are available on a confidential basis to help manufacturers plan for profitable production by Vacuum Drying or other vacuum processing operations.



• Send for a copy of this new 24-page brochure, "Vacuum Drying", which describes the uses of vacuum drying and the wide range of processes and equipment by which materials are dried under vacuum.

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RESEARCH . . . . . .

Reagent News: Fisher Scientific Co. (Pittsburgh, Pa.) has added six new products to its reagent line: S-435 sodium tartrate dihydrate, a primary standard for the Karl Fischer reagent; B-260 benzidine dihydrochloride, for detecting blood, estimating hemoglobin and determining acetaldehyde, furfural, sulfate and several cations; D-37 methylene chloride. M-282 methyl cellulose, N.F.; C-252 cerous chloride, C.P.; and C-260 cerous oxalate, C.P., round out the sextet.

•

Bio Buildup: Ground will be broken in Sept. for Hercules Powder Co.'s new $400,000 biological laboratory at the company's Wilmington (Del.) experiment station.

The new building will house research on insecticides, fungicides, herbicides and defoliants. It will also serve as a coordination center for research farmed out to independent commercial laboratories and agricultural experiment stations. Estimated date of occupancy: April, 1953.

•

Expansion: Tennessee Products and Chemical Corp. is doubling its research facilities with the addition of a new two-story building at Chattanooga.

•

Latex Probe: Development of applications for latex products in the textile and paper industries is the objective of a newly-initiated project at Georgia Tech Engineering Experiment Station. Sponsor: Southern Latex Corp., Austell, Ga.

•

Static Under Fire: Speaking before a gathering of the American Assoc. of Textile Colorists and Chemists in Providence, R. I., recently, Sidney M. Edelstein—technical director of Dexter Chemical Corp.—sounded a call to arms against static electricity. Said Edelstein: "Static electricity is a challenge . . . which must be met if the new synthetic fibers are to be fully utilized in textiles."

To prove his contention, Edelstein pointed up the negating effect of static on the synthetics' most desirable properties. For example, allergy-free pillow cases made from synthetics often attract enough dirt and microscopic particles to defeat their purpose. And work clothes of certain chemically-resistant synthetics, according to Edelstein, are "a potential explosion hazard because of their ability to build up static charges to the point where explosions of solvents may take place."

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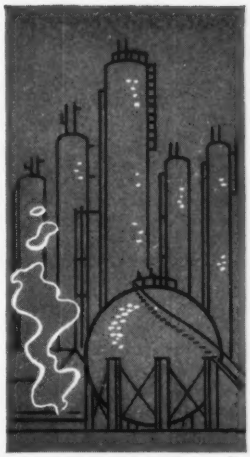
Discovery: University of Chicago researchers have found that oiling of floors and blankets helps reduce the



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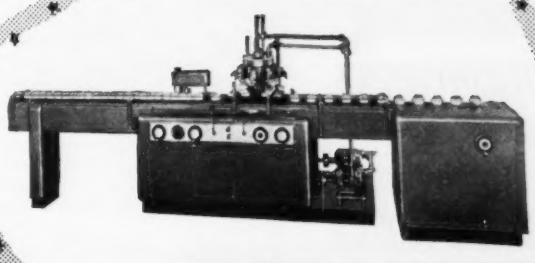

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SIGMUND OSTAPOWICZ, master glass technician, flares an 85 mm. tube on the glassblowing lathe at Wakefield Industries, Inc. (Skokie, Ill.). A specialist in scientific glassware, Wakefield has just set up a novel mail-order system to reduce the inconvenience of procuring special non-catalog glass equipment. The prospective customer merely sketches the desired apparatus, retains a carbon copy, mails the original to the company. A price quotation, or the finished item, makes the return trip. Wakefield now encloses sketch sheets with all catalogs.

spread of upper respiratory diseases in places like army barracks and hospitals. A special emulsion-base oil, used in tests sponsored by the Army's Office of the Surgeon General, drastically reduced bacterial contamination of blankets in army barracks.

•

Unlucky Seven: Statistics make the case for safety. Here's one from Arthur Smith, research engineer in charge of Ford Motor Co.'s radioactive isotope research laboratory: In the history of American radioactivity experimentation, only seven persons have been injured to date.

•

New Division: American Polymer Corp. has established a new division to be called the Textile Division. It will include textile research and application laboratories to explore new market possibilities for the company's synthetic resins.

•

The Score: Here's how the fiscal year, Mar. 1, 1951, to Mar. 1, 1952, shaped up for Mellon Institute of Industrial Research (Pittsburgh Pa.).

Expenditures for pure and applied research amounted to $3,835,314. Of this sum, $727,654 was spent for investigations in pure science. In all, 117 members of the Institute were engaged in various pure science research projects.

The Institute's applied science researches were conducted by 77 fellowships employing 441 members. A total of 86 fellowships were in operation during the year supporting programs employing 282 Institute fellows and 246 aides.

During the calendar year 1951 the Institute staff authored 1 book, 15 bulletins, 67 research papers and 65 other scientific articles. Since its part in 1910, the Institute has published 28 books, 260 bulletins and 2,820 journal contributions. Members of the Institute were awarded 52 U.S. patents in 1951, bringing the grand-total of patents accrued since 1911 to 1,276.

The Jones-Dabney Division of Devoe and Raynolds Company began using Glycerine to produce alkyd resins over 30 years ago. Today, the same Glycerine-derived alkyds which are used for every industrial coating application from bobbypins to battleships—can also be found in the famous Devoe line of enamels and interior finishes.

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Pioneers in this new application of alkyd resins is America's oldest paint maker: Devoe and Raynolds Co. Inc. For years Devoe has recognized in Glycerine a vital chemical intermediate in the manufacture of its alkyd resins and ester gums. With these Glycerine-derived alkyds, Devoe marine and industrial coatings have earned a world-wide reputation for gloss, brightness and resilience.

Like Devoe, America's leading paint makers have found Glycerine easier to work with in the critical resin-making operation. For light-colored alkyds, Glycerine is available to meet the exacting standards of the color-conscious paint industry.

"Why Glycerine for Alkyd Resins and Ester Gums?" tells the story of these applications with detailed information on the chemical and physical properties of Glycerine. Write for your copy.

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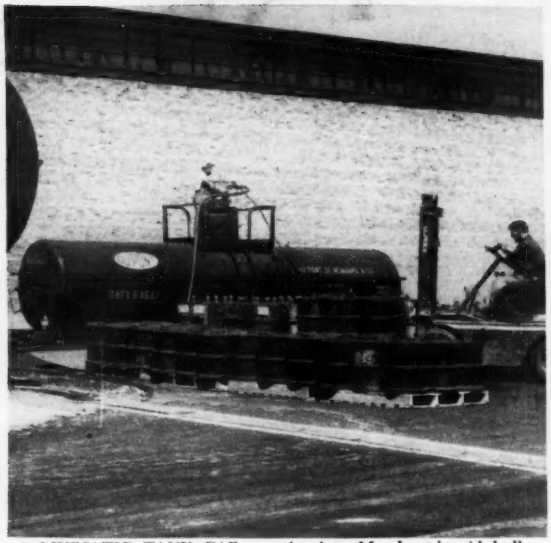


A MURIATIC TANK CAR empties into Merchants' acid bulk-storage tanks (to the left) at new Chicago distributing warehouse.

GLASS CARBOY QUANTITIES are what the customers buy, so Merchants washes, drains, and fills them on assembly-line basis.

DISTRIBUTION . . . . . .

The Distributor—Man in the Middle

One of the twists of our times is that the same supply-and-demand conditions which have caused the demise of the speculative reseller (CW, May 10) are coincidentally enhancing the importance of his middle-man cousin, the chemical warehouse distributor. As a grass-roots peddler, the latter's services are critically needed by manufacturers now that every sales order, no matter how small, is a big help. In keeping with this new importance, the CW Camera travelled to Chicago last week to record the behind-the-scenes flow of products in the Merchants Chemical Co.'s spanking new Windy City outlet.

Big to Little: The chemical distributor's function in the process industries is closely analogous to that of both the wholesaler and the retailer in the distribution pattern for consumer goods.

His services to his customers revolve around his ability to have needed materials in the right places at the right times. To do so, he must have a wide variety of products in open stock and a high flexibility in the quantity which can be efficiently delivered per order.

The main advantage which he offers to the manufacturers who are his suppliers is his intimate knowledge of the local market. Such close contact with individual buyers would be prohibitively expensive for a nationwide selling organization with just a few products to handle.

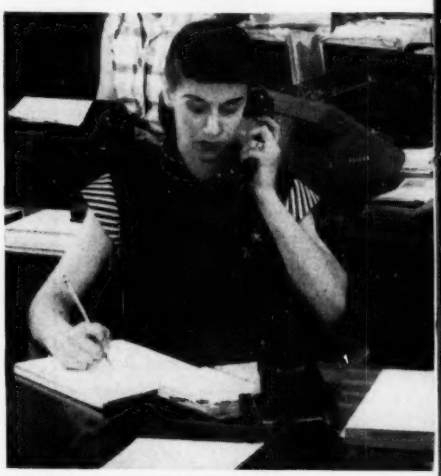
But as the photographs show, the distributors main contribution is the facility to break economically large shipments (from the producer's point of view) into the smaller units which an average small consumer would like to receive per delivery.

This is not always an easy task, especially when dangerous-to-handle chemicals are involved. Merchants Chemical takes special pride in the super-efficient carboying operation it has installed at the new Chicago branch. But in spite of the frequent delivery and pick-up runs by its nine trucks, it still takes a revolving stock of 3,500 glass carboys to keep the local acid customers supplied.

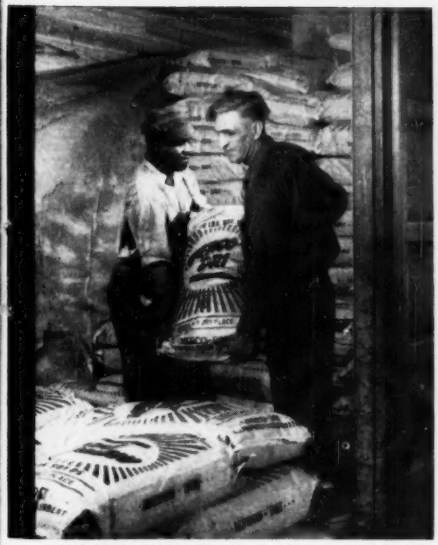
Quantity Mark-up: It is this breaking of a single big shipment into a number of little ones which provides the distributor with his major source of profit. The normal discount for legitimate resale is at most only 5-10%. This narrow margin could hardly pay for Merchants' Chicago force of nine salesmen, ten office workers, manager Ray Harcombe, and twenty-four warehousemen and truck drivers.

These activities are supported by cashing in on the price spread between carload and less-than-carload quotations. The trick is to buy at one level and sell at the other. In addition, the distributor can follow the schedules established by the manufacturer for the two classifications and still do better than the producer who tries to handle the smaller shipments directly from his plant. The extra profit comes from freight savings which the distributor realizes on his large orders, but which he does not have to pass on to remain competitive with manufacturers' LCL delivered prices.

With his income thus based on solid services rendered at no extra cost to the customer, the chemical distributor is one "middle-man" who can stand up to any economic winds with full confidence in the future.



QUICK PAPERWORK on 2,000 orders a month is handled by branch office—maintains local touch.



CARLOAD PURCHASES are key to distributing profits. Warehouse siding can handle five at a time.

VARIETY IN ANY QUANTITY, ready for quick delivery, calls for efficient storage management. Merchants tries to turn over its entire stock once a month.

Chemical "General Store" Grows Up

With the paint still drying on their new Chicago warehouse, officials at the New York headquarters of Merchants Chemical Co., Inc., are leaning back with the air of men who think they know a thing or two about selling chemicals.

For Merchants' president Lem Skidmore, the new installation marks one more landmark in the steady growth of his company since its founding by the late Irving H. Taylor twenty-seven years ago.

Under the guidance of Skidmore and Taylor, the company has expanded its activities to the point where in 1951 its nine branches handled gross sales of $7-8 million. Even with the return of normal market conditions this year, its sales tempo is holding up close to last year's record.

Big-Name Agent: The three Midwestern warehouse companies out of which Irving Taylor fashioned his original company set the style for the later additions. Trucks bearing the merchants name now roam Chicago, Cincinnati, Denver, Louisville, Milwaukee, Minneapolis, New York, Omaha, and Appleton, Wisconsin.

The roster of manufacturers represented by Merchants sounds like a

A BIT OF EVERYTHING is typical Merchants' truck-fleet load, being readied for a delivery run around its Chicago circuit.

Who's Who of the chemical industry. It includes companies like Wyandotte, Du Pont, and Dow. From these firms, the distributor obtains the 350 products which its branches keep in stock at all times.

But in spite of these physical and commercial assets, says Skidmore, it still takes salesmanship to be a master chemical merchant.

'Tween Size Organics

Some find the manufacturer's fifty-five gallon drum to big; others think that five-pound bottles from the lab supply house are too small. Purchasing agents who discover themselves in this double muddle have received good news: a list of industrial organics which have been repacked into middle-sized five gallon cans and which are now available from the Matheson Co.,* East Rutherford, N.J.

A feature of the new catalog just issued is that it emphasizes the identity of each organic's manufacturer. Matheson is frank to admit that it does nothing but transfer the material from drum to can. In fact, the company recommends that if any more than a few containers are needed, the buyer should place his order directly with the producer.

This is in keeping with President George Ferris' claim that his company was practically forced into instituting such a service. According to Ferris, so many purchasing agents were asking Matheson as a favor to give them five-gallon lots out of its own raw material stocks that the issuance of a catalog to formalize the transactions became a necessity.

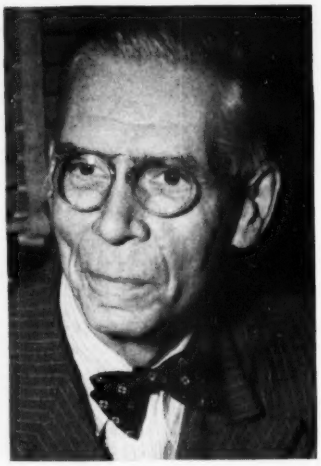
Service before Dollars: For a long while now, the Matheson Co. has been making a good thing out of its accent on service. It has carefully limited its scope of activities to those ventures in which success depended more on such factors as prompt delivery and exacting quality rather than on the lowest competitive price.

This was certainly the case for the original cornerstone of the business: compressed gases for research and medium-sized commercial operations. Matheson is now able to offer from stock any one of 75 different gases in six different sized cylinders. Moreover, it will prepare a mixture of any of these gases according to the customer's recipe—provided the combination isn't explosive.

The next step was to carry this type of service into the field of special organic chemicals, a much more competitive area. The move was accomplished three years ago by the purchase of Paragon Chemicals. The original list has subsequently been expanded to cover over 2,400 items, making Matheson one of the leaders in this type of operation.

Against such a background, the "Commercial Chemicals" title of Matheson's latest price list makes it clear that a major new departure is in the making. True to its history, however, the firm has apparently surveyed the field to find the spot where it can be of service, and having found it, is going to make the most of it.

* No kin to Baltimore's Mathieson Chemical Corp.



KEYNOTER NOURSE: Unwelcome adjustments by 1953.

P. A.'s in the Saddle

More than 3,000 purchasing agents were given the word last week in Atlatic City. Speaking at the first general session of the National Association of Purchasing Agents convention, Edwin G. Nourse gave an economist's confirmation to the fact that today's is a buyers' market.

The former chairman of the President's Council of Economic Advisers described it as a "real but not ruinously competitive" situation. His listeners, the nation's buyers, would now be at the throttle of American industry, but in his opinion the real challenge for the future lay in the hands of labor and management. Between them the latter two would have to keep prices down at the level where the purchasing agents would buy.

Change of Thought: If such a goal is to be reached, labor leaders and management officials will both be forced into "unwelcome adjustments" in their thinking between now and the end of 1953. They will have to realize that both sides have a vital stake in keeping the total costs of production down.

The need for such concessions toward the common good is especially important, said Nourse, in such basic industries as steel and oil, where the effect of buyer resistance to higher prices is less sensitively gauged. An accumulative slow-down in these areas has a wide-spread effect which hurts both labor and management, since it hits at the public's ability to buy consumer goods.

Nourse also lashed at the trend toward economic adjustments by government fiat. Such questions as are raised by the current steel fracas should be settled in the market place, where the purchasing agent is in permanent residence, rather than by Federal directive.

37th Meeting: This year's convention marked almost four decades of activity by the purchasing agents' association. Lasting from Sunday through Wednesday and staged in Atlantic City's Convention Hall, the meeting highlighted talks by industry and government leaders.

But the discussions which most closely mirrored Edwin Nourse's "buyers' market" remarks were the commodity forums (on chemicals, petroleum products, etc.) where industry buyers took off their coats and talked shop. They are the men who are now in the saddle.

•

Rubber Stabilizer: The Naugatuck Chemical Div., United States Rubber Co., has introduced a new rubber stabilizer which is specifically designed to improve light-colored GR-S formulations. An alkylated aryl phosphite, it has been trade-named Polygard.

•

Across the Board: A vinyl-chloride resin plasticizer which can be used in all major vinyl plastic compounding has been put on the market by Carbide and Carbon Chemicals Co. Available in tank-car quantities, the product will be designated as "Flexol" plasticizer CC-55.

•

Corduroy Road: Chemical commerce may move around on steel rails, but it also rides on a lot of wood. During 1951 the nation's railroads spent $1 million every four days for wooden cross-ties.

•

Philippine Guide: A new edition of the "Market Guide for the Philippines" has been published by the American Foreign Credit Underwriters Corp. (New York City). The guide now carries information on U.S. exporters who have established Philippine outlets.

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PRODUCTION . .

Cashing in on Safety

For the tenth year running, Du Pont receives the National Safety Council's highest industrial award.

Du Pont's Queener points out that safety breeds economy: The most efficient method is usually the safest too.

Making and breaking safety records is getting to be a habit with Du Pont. In 1950, for instance, it became the first company ever to receive the National Safety Council's highest award —the Award of Honor—nine years running. And the NSC has just presented it with the same award for 1951.

Last week, to find the secret of Du Pont's prize-winning performance, CHEMICAL WEEK interviewed J. Sharpe Queener, who heads up the Safety and Fire Prevention Division, is looked on throughout the company as "Mr. Safety."

CW found Queener eager, sincere and articulate on his pet subject. One of the first points he brings out is the economies that accrue from a good safety record. For one thing, insurance companies base their rates to a certain extent on the company's past history in safety. But more important, says Queener, is the fact that the safest way of doing a job is almost always the most efficient too. He reports that every dollar Du Pont spends on safety comes back through savings on operating costs.

Where the Need Is: Queener figures that most smaller companies feel that only the big ones can afford to set up fancy safety programs. "Actually," he says, "no company can afford not to be safe." Moreover, it's among the small companies that there is the biggest room for improvement. To prove this, Queener points to National Safety Council figures. Firms that fall into the Government's classification of small business (employing less than 500 people) account for only half the working force, yet have twice as many industrial accidents as the big companies.

Queener is convinced, however, that "size" and "safety" don't necessarily go hand in hand. Says he: "Take Du Pont. As far as safety is concerned, each plant operates as a separate unit. When a man takes over as plant manager, he takes over responsibility for the personal safety of his workers just as he does for production costs and product quality. And out of our 100 operating plants, two-thirds employ less than 500 workers; 25%, less than 100."

Strictly Staff: His own division Queener describes as staff rather than line. Its job is to set policy, coordinate and advise; it has no actual authority. "In fact," he says, "if you were drawing an organization chart, you wouldn't even connect the division with the plant safety organization by a dotted line."

In the individual plants, of course, the safety set-up varies slightly with the size, product and special problem. But in general, committees have been found the most effective means of promoting safety. In a typical plant there

DU PONT'S QUEENER: There's room for improvement all around.

are committees at three levels: a central committee, departmental committees and foremen committees.

• The central committee meets at least once a month. It is made up of the plant physician, safety engineer and all the men on the plant staff who are responsible for departmental operations. The safety engineer serves as permanent recording secretary; either the manager or assistant manager as permanent chairman, for either can give management's decision on practically all questions. In either case, the plant manager attends all meetings.

The central committee originates, guides and coordinates the over-all plant safety activities, also serves as a distribution medium for policies. It

supervises education, conducts final investigation of personal injuries. It may make special inspections and develop means for the elimination of hazards. The committee also enforces plant safety rules, adopts and promulgates engineering safety standards. It is responsible for the installation and maintenance of safety devices and directs all safety publicity, contests and campaigns.

In some of the big plants, subcommittees are formed to work on special problems. For example, a subcommittee might deal with personal injury investigations, plant inspections or practices and standards.

• Departmental committees meet semi-monthly at least. They are made up of the department head who acts as permanent chairman and the foremen in the department. If it is impractical for all the foremen to serve at the same time, the membership is rotated. Duties and functions of the departmental committee parallel those of the central committee, but on the lower level.

• Foremen committees meet for short periods frequently—at least once a week. The foreman is the head of the committee and the workers under him make up the rest of the membership. If all the workers can't participate at once, membership rotates. The foreman committees act on all safety problems within its area with which it can cope. Other problems are referred to the higher committees.

Start With Design: According to Queener, any good safety program starts in the design stage of a new plant. As he puts it: "That's where the sperm meets the egg." With Du Pont that idea goes back to the founder, E. I. du Pont de Nemours. He built all his plants with three strong walls, a weak roof and front so that any explosion would exert itself away from the other buildings.

The original du Pont brought to this country some other ideas on safety which were then considered revolutionary. To boost workers' morale, he insisted that management and their families (usually du Ponts) live on the plant grounds. He also inaugurated a policy whereby any time a new—or rebuilt—mill started up, no worker could enter until an executive operated the machinery and turned out a batch of powder.

Many of his ideas, in fact, are incorporated in the present day Du Pont "Safety Philosophy" embodied in five points:

• A positive belief that all personal injuries can be prevented.

• An acceptance on the part of man-

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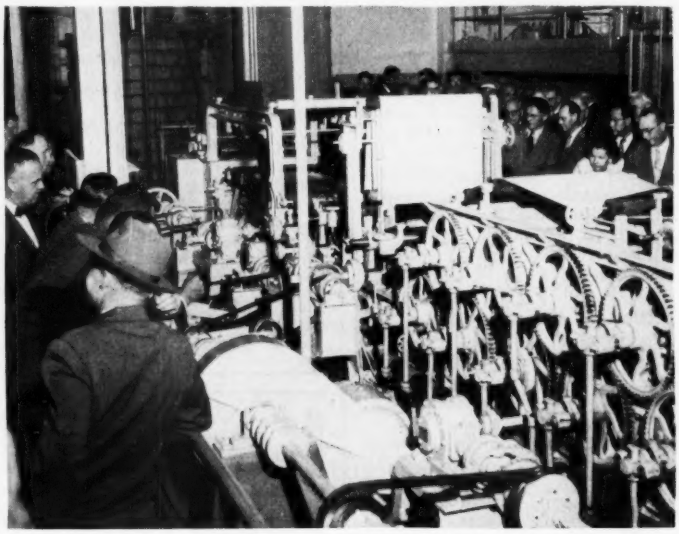
agement, which includes all levels through the foremen, of their responsibility to prevent personal injuries.

•A conviction that it is reasonably possible to safeguard all operating exposures which may result in personal injuries.

•A recognition that it is necessary to train all employees to understand that it is to their own advantage, as well as the company's, to work safely and that they are expected to cooperate in doing so.

•An acceptance of the fact that it is good business from the standpoint of both efficiency and economy to prevent personal injuries.

"On the last point," says Queener, "we've proved that to ourselves a long time ago and now we can afford to talk from the humanitarian standpoint. In 1951, our frequency rate (time-losing injuries per million man hours worked) was 0.67, an all-time low for us. It means that over a span of twenty-five years, 31,000 Du Pont employees have been saved from personal injuries. But we feel that there is still room for improvement."



DEDICATION OF THE MINIATURE: Small-scale mill for large-scale problems.

Forty Foot Miniature Mill

Crown-Zellerbach's fully integrated paper mill in miniature started operations last month. Part of the company's new $500,000 laboratory at Camas, Wash., it's the first of its kind for the paper and pulp industry.

Actually, the small scale mill is 40 ft. long and is classed as a miniature only by comparison with conventional mills that run up to 600 ft. in length. The idea for it was conceived over a year ago to step up development operations *(CIW, Apr. 14, '51)*. It will be used to work out production techniques for new products developed by C-Z chemists and to eliminate any bugs that appear in processes after they are placed in commercial production.

One of its chief virtues lies in the fact that new kinds of paper can be made on a test basis without stopping production in one of the big mills. That should mean significant savings in time, says Wendell Moyer, G-Z's director of research. As an example, he cites development of rosin paper on plywood overlays. The project has been under way five years. With the added convenience of the small mill, Moyer figures at least two years could have been saved.

The miniature mill will be able to do anything a full-scale one can do. It can, for instance, turn out sheets of paper 26 in. wide and coat them with wax, gum or other substances, to make laminated and impregnated paper.

And it may play a part in the development of new products since a large portion of the new lab is earmarked for studies of what Moyer calls "the half of the log that is being lost as waste liquor." Company researchers will concentrate on working up new by-products to follow Orzan, the first product derived from ammonia based sulfite liquor introduced this spring.

Catalysis Goes to Court

In the high-ceilinged Lehigh County Court House in Allentown (Pa.), last week, Judge John H. Diefenderfer was in for a rare treat. For Eugene Houdry, the noted petroleum scientist, was preparing to pass pungent commercial propane through a special catalytic unit to produce odorless carbon dioxide and steam. His aim: to show the effectiveness of the unit in combating industrial fumes.

The whole business started last September when 92 residents of Allentown complained of "penetrating, disagreeable and noxious odors" emanating from fume disposal stacks of the

HOUDRY WITH UNIT: A courtroom plug for a pollution process.

Enamelstrip Corp., sought an injunction against the company.

Meanwhile Arthur Uhleen, executive v.p. and general manager of Enamelstrip, had read of Houdry's Oxy-Catalyst Manufacturing Co. The firm was turning out units that oxidized hydrocarbon vapors into carbon dioxide and water. Although they were being marketed for use on industrial trucks, Uhleen figured they might turn the trick on other fume disposal problems.

After getting in touch with Houdry, Uhleen sent him a sample of the effluent gases (principally mixed xylols). Tests proved satisfactory and Uhleen decided to go ahead with the commercial unit.

Inside the Unit: The Houdry catalytic unit consists of two porcelain end plates, a spacer bar and 73 porcelain rods. Each rod is coated with a 0.003 in. film of catalytic alumina and platinum alloy. Houdry says platinum itself is a satisfactory catalyst but its life is short. On the other hand, he

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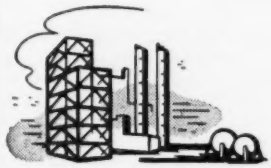

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PRODUCTION . . . . .

has found the alloy to be 90% effective after 5,000 hours of steady use.

Uhleen reports that not only has the installation eliminated the odor problem, but it will pay for itself in six months. The oxidation process is exothermic to a point where it is commercially feasible to use the gases as a source of process heat. Says Uhleen: "The entire installation cost us about $16,000 but has saved us 90% on our monthly fuel bills that used to run about $3,000 a month.

Inside the Court: Although no decision was expected from Judge Diefenderfer immediately, by mid-week many court room observers felt the outcome was a foregone conclusion. Furthermore, a check by Enamelstrip just before the trial of 16 of the 92 residents involved showed overwhelmingly that they felt the cause of the disturbance had been removed. But the company was determined to carry the proceedings through to get a clean slate. For Houdry, of course, the hearings and the resultant publicity add up to a nice plug for his process.

EQUIPMENT . . . .

Multi-Temperature Control: Illinois Testing Laboratories, Inc. (Chicago) has introduced a new temperature control unit. Called the Alnor Pyrotac, the new unit automatically monitors up to 20 separate temperature points a minute. The Alnor Pyrotac should find application in research and processing where close control is desired.

•

Redesigned Pumps: Ingersoll-Rand Co. (N. Y.) has redesigned its line of horizontal, multi-stage centrifugal pumps for medium pressure uses. The new pumps, Class CNTA, are claimed to give higher efficiency and superior operation. Units are available with 4, 6 or 8 stages and are built in 1½, 2, 2½ and 3 inch sizes. They are recommended for boiler-feed, mine dewatering, marine, refinery and general industrial services to 800 lbs.

•

Resistant Chemrok: A new resistant plastic material, Chemrok, is now available from The Richardson Co. (Melrose Park, Ill.). Richardson recommends that its new product be used as a corrosion-resistant material in the rayon, pulp and paper, petroleum, mining and chemical process industries. A moldable material, Chemrok can be used for fabricating filter plates, plating barrels and similar equipment where load, temperature and chemical resistance are desired.

•

Trouble Indicators: Tigerman-Anderson Co. (Chicago) has just come up with a new type of automatic alarm unit called the Tel-Alarm. These units are recommended for signalling failure or abnormal operations of valves, pumps, heaters and other processing equipment. Tel-Alarms are unitized and hermetically sealed, are constructed to take a variety of circuit arrangements from a single basic alarm unit.

•

Improved Mercury Switches: Newly designed mercury switches are now being offered by Minneapolis-Honeywell's Micro Switch Div. (Freeport, Ill). The new switches are embedded in plastic "potting" compounds for added protection and are accordingly claimed to be more rugged than their standard glass-enclosed counterparts. Additional improved features are also claimed for these units.

•

Test Filters: A complete miniature filtration system is now being produced by Hercules Filter Corp. (Paterson, N. J.). The miniature pressure leaf filter system is recommended for test purposes where filtering operations, medium and similar evaluations are required.

•

Metering Molten Metal: A magnetic flowmeter, for the remote measurement of molten-metal flow, is now available from the Special Products Section of the General Electric Co. (Schenectady). G. E. claims that its new flowmeter offers maximum safety where hazardous metals, such as sodium, sodium-potassium, and lead-bismuth alloys must be metered. Any potentiometer can be used to measure the flowmeter's multivolt output.

•

Dehumidifier Exporters: The Philips Export Corp. (N.Y.) has been named to handle overseas distribution of Dryomatic Corp.'s automatic dehumidification machines. Dryomatic units are continuous absorption type dehumidifiers, using a combination of activated alumina and silica gel as desiccants.

•

Teflon: Ethylene Corp. (Summit, N.J.) is now offering Teflon in a number of new sizes and forms. The revised size and price table lists Teflon in the following forms: shaved tape, molded sheets, molded round tubing, beading, and extruded and molded rod.

•

Koroseal Uses: Metalweld, Inc. (Philadelphia) is now offering a "Koroseal Bulletin" which discusses, illustrates and gives data on the application of flexible Koroseal. Uses discussed include plating, tanks, racks, vats, etc. for handling various chemicals.

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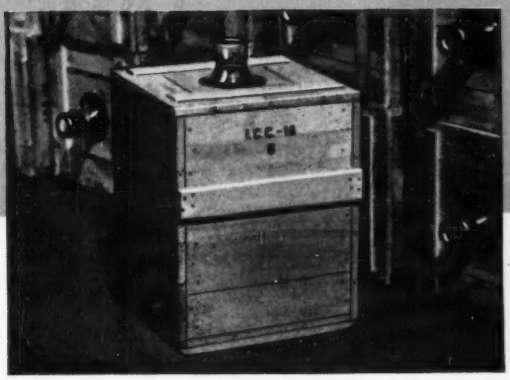
A CONTINUED STORY BY ONE OF AMERICA'S OLDEST GLASS MANUFACTURERS

The Case of the Acid Carboy...

by GAYNER



CHAPTER THREE

One of the first practical low-cost containers for shipping acids and other corrosive liquids was the glass carboy bottle made by Gayner almost 60 years ago. Every chemical manufacturer at the turn of the century recognized these sturdy glass containers as "acid" carboys, and the name has stuck ever since. Their use, however, has grown in many directions.

Today, Gayner glass carboys serve as more than just an "acid" carrier. They are used to ship and store essential oils, drugs, shampoos and hair tonics—for bulk packaging of fine powders, granular and crystalline chemicals—for fruit pectins, syrups and extracts—for pharmaceuticals in tablet or capsule forms, and many other diversified uses.

Chances are, your production department is already using Gayner glass carboys—13-gallon MCA Standard—for safe shipping of hard-to-handle liquids. If not, you will want to know about the advantages of these clear, strong, easy-to-handle glass carboys—their ease of cleaning and repeated re-use—their resistance to chemical attack, corrosion, pitting and absorption of fluids—their low initial cost and economy in shipping expense.

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4. Resistant to chemical attack. No pores or pits to absorb water or chemicals.
5. Bottle held firmly by cork wedges. All corners of box securely cushioned.
6. Light in weight—low return costs.
7. Box is clear, sturdy, seasoned white pine. Bottle easy to install; convenient to handle and store.
8. Approved by Bureau of Explosives. MCA Standard 13-gallon carboy bottles.

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Chemical oil additives, 30 million gallons of them, will be used this year to improve motor lubricant qualities. And one bright forcast: By 1955 50 million gallons may be used, value may touch $200 million.

Though demand for detergent and inhibitor compounds is high, additive makers see no trouble getting basic supplies.

Chemical additives for lubricating oils is a business that's grown so fast it even has the specialists confused.* The old designations for various grades of motor oils were regular, premium, and heavy duty, but this week the American Petroleum Institute began distributing instruction material on new terms for oils: MS, MM and ML are the designations for automobile oils (in order of decreasing additive content); DS and DG are the new tabs for diesel oils.

Latest product for boosting oil quality is American Cyanamid's Aerolube 92, a detergent-antioxidant designed for high sulfur content petroleums, introduced this week. It's only the latest entry in the field of oil improvers, a business that has grown thirty-fold in the past dozen years, now has a value comfortably over $100 million yearly.

Detergents designed to keep sludge and dirt particles in suspension, and inhibitors to cut oxidation and corrosion, are the big items in chemical additives, though pour depressants, viscosity index improvers, anti-foaming agents, and the like are required in quantity too. One estimate puts inhibitor and detergent consumption for heavy duty oils alone at 2.2 million gallons (in oil base) a month.

And the consumption will be going up. The armed services, demanding higher quality, longer wearing lubricants, have specifications for oils (Mil 2104 and 2104B supplements) which will require up to 20% additives.

Cheaper to Buy It: Not many of the oil companies have found it profitable to make their own additives; not all the additive makers produce their own raw materials. Shell, Standard of New Jersey, Standard of Indiana, and the Pacific Coast's Oronite Chemical (which sells to others), do much of their own additive development; American Cyanamid, Lubrizol (Cleveland) and Monsanto are leading non-captive suppliers. (Lubrizol is the largest of the independents.) L. Sonneborn and Sons (New York) supplies many of the sodium salts of petroleum sulfonates which are made into lube detergents, and Rohm & Haas makes pour depressants and viscosity index improvers.

All these makers are in a pretty good supply position this year. Last year, phenol and sulfuric acids supplies were tight, but except for selenium used in some oxidation inhibitors, producers currently are encountering no trouble in getting the requisite 30-40 basic chemicals.

Combat's Child: The Army's Ordnance Department, in last war, was largely responsible for the growth of the additive chemical industry. The Department, demanding an oil that could be used in all vehicles under a variety of operating conditions, set up specification 2-104A. Industry met the requirements for such an all-purpose oil by improving quality base stocks with up to 2½% additives, and there is no record of mechanical failures due to defective oil. Since the war development of detergent- and additive-containing oils has continued. Now a well fortified oil ups cost to maker about 5-7¢/gal.

Perhaps the leading detergents at this time are of the sulfonate or phenate type. Barium or calcium sulfonates (neutral or basic petroleum sulfonates, or wax-substituted benzene sulfonates) are the principal one used in crank-case oils. Oronite claims to be the only outfit compounding with calcium.

Sulfur-phosphorus compounds (dithiophosphates, and either terpene- or polybutene-phosphorus pentasulfide reaction products) are the most widely used inhibitors. Both sulfur and phosphorus have long been used as inhibitors; the problem has been to prevent them from being corrosive, at the same time retaining their inhibitory characteristics. Incidentally, the sulfur in the detergent sulfonates, present in SO_3 radicals, does not have inhibitory properties.

But chemical additives had been in use long before the war.

Since '25: Standard of California claims to be one of the first to compound an oil with a chemical improver. Back in 1925, a special oil was formulated to cope with problems in lubricating of the Model T Ford's planetary transmission.

Pour point depressants, to make oil flow even at low temperatures, without expensive refinery de-waxing, were among the first commonly used additives. Viscosity index improvers, which reduced the effects of temperature on viscosity were also available in the thirties, as were some types of detergents for diesels.

These detergents, chlorinated cal-

* A sign of the present confusion: Buick dipsticks read "use heavy duty motor oil only," while Buick servicemen have signs reading "Premium motor oil used here exclusively."

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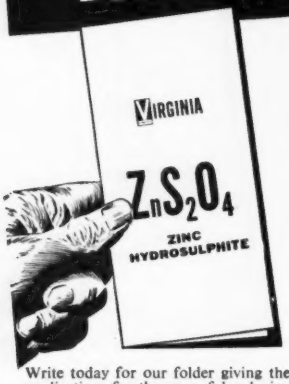

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cium stearates and certain aluminum naphthenates had two drawbacks: They speeded up oil oxidation, and they sometimes corroded bearings. But they were used until the more satisfactory sulfonates and phenates were developed.

Problems Remain: Despite the improved chemical additives, there is room for much more work. Much of the present development has been in the line of oils for high temperature, high speed work. Similarly severe, from the standpoint of engine wear, is "cold" operation, where much of the time the engine only idles. Delivery trucks, and similar frequently stopping vehicles produce considerable acid in the oil. Shell, among others, has developed oils (Rimula oils) with high alkalinity for this.

Shell has found its oils also reduce the annoying smoke production in small warehouse lift trucks. (Union Carbide's synthetic Ucon lubricants, of the polyalkylene glycol type, are also known to reduce this smoke problem.)

Future Bright: Most forecasts of the chances for lube additives are cheerful. Consumption seems bound to go up, and though the prices will drop on many of the fortifiers, a market of $200 million wouldn't be surprising. Oronite ventures the opinion that U.S. consumption should be 50 million gallons by 1955.

And the market abroad is hardly touched. Increasing use of American machinery, like diesel farm tractors and the like, will require that overseas lube suppliers stock fortified oils, buy additives.

ALDRIN FOR DAMASCUS: Chemicals for the Middle Eastern cold war.

Insecticides Win Middle East Allies

In the tense Middle East, where the free nations quietly struggle with Russia for influence, chemistry has become a vital weapon. Last year the United States won a round by supplying the insecticide aldrin to combat a locust plague. This year, with another scourge of locust in sight, Russia has given ten planes, 50 tons of insecticides to aid the peoples of Iran and Pakistan. But we're not out; two tons of aldrin have been flown over, and a total of 77 tons are on the way as we seek to retain the past-won goodwill.

Already two United States-financed planes are spraying infested areas of Iraq under Point Four Plan aid, two more have gone to work in Iran this week; a couple of others are in south-

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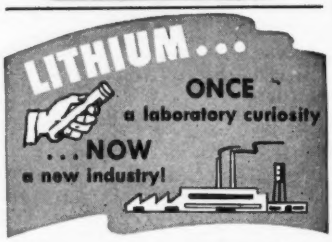

NO longer in the laboratory category of scientific curiosity, Lithium has achieved the status of a new industry through the medium of applied research. Lithium's commercial significance embraces field after field. The amazing increase in usage of Lithium and Lithium chemicals has been possible largely through the extensive development work of Metalloy Corporation, basic to this fast-growing industry.

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METALLOY CORP., Division
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ern Pakistan; and four more have been dispatched to Jordan and Karachi.

Six other Piper Cubs, given to Iran last year, are on the job now combatting the locusts. They're piloted by pilots trained under the Point Four program. And the UN has allotted half a million dollars for locust control.

Chemical Advantage: But the Russians, sending along spraying crews to man their planes, and providing 500 tons of bran bait in addition to the 50 tons of insecticide, aren't packing up and heading for home just because we're there. More discouraging to them is the fact that we are providing better chemicals.

Aldrin, supplied by Shell Chemical Co., and made in the now-Shell-owned Julius Hyman plant in Colorado, has proved to be about 50% cheaper to use than any other control. Two ounces in oil or water spray effectively knocks out the locusts, killing them by attacking the nervous system.

The British, too, are in on the fight to control locusts. They're pushing the use of benzene hexachloride, largely made by ICI.

These chemicals promise eventual control of the locusts, which have been plaguing the Middle East since the time of Abraham. The insects cost African, Middle Eastern, and South Asian countries an estimated $90 million per year when they're swarming, but they could cost more this year if control efforts fail. For though last year's plague was bad, this year's is said to be worst in 100 years.

Starting last January in a small area in East Africa, the hordes of whirring insects have swarmed into wide areas of French Somaliland, Eritrea, the Sudan, Aden, Yeman, and onto Jordan, Egypt Israel, Syria, Iraq, Iran, and Pakistan.

Deep Implications: Serious locust damage could cause an unmanageable situation in certain of the Mid-East areas. Iran, without its oil revenues, could easily fall into the hands of the communist Tudeh party. And India is already facing a famine caused by the drought this year. Further losses can ill be borne.

That's why Point Four officials and Middle Eastern governments are so hopeful about aldrin. It's proved to be the most effective of the chemicals tried, including the undisclosed compounds the Russians are providing.

•

Inroads of Liquor: More than 350 miles of unpaved roads in Clackamus County, Ore., will be treated this summer with waste sulfite liquor furnished without cost by the Publishers Paper Co. (Oregon City).

About half the mill's daily output of 200,000 gallons of waste material will be sprayed on the roads to prevent deterioration, eliminate dust. If tests are successful, mills at Salem and Newberg, Ore., may be tapped.

•

Where Krilium Leaves Off: Monsanto Chemical Co. is boosting capacity for production of phosphoric acid, ammonium phosphates, and potassium phosphates, used in making liquid and water soluble plant nutrients.

•

For Aerosols: The USDA has approved use of sulfoxide in aerosols, okaying formulations employing up to 5% of the synergist made by S. B. Penick & Co. (New York).

•

Add Water: On sale now in the Cleveland area, and slated for national distribution soon, is a "dry" automobile battery made by Firestone Tire & Rubber Co.

Utilizing a new type separator, the new battery is shipped without acid in it. The dealer keeps it dry until sold, when he adds the fluid, (distributed in polyethylene containers) after which it is maintained like ordinary batteries. Battery sells for about $1.50 more than most, is guaranteed three months more than most.

•

For Smoother Going: Molykote-Centerlube, a molydenum disulfide powder for dead center lubrication is now offered by the Alpha Corp. (Greenwich, Conn.).

Boston Meeting

Chemical Specialties Manufacturers Assn., meeting in Boston June 9 and 10, has scheduled some 60 speakers to cover topics vital to makers of industrial and household chemical products.

Of particular interest are symposia on:

- Army and Navy aerosol procurement program
- Paints in aerosols
- Aerosol valves
- Test methods of germicide evaluation.
- Industrial uses of insecticides
- Insect control by chemical vaporizers.

The two day affair at the Boston Sheraton Plaza is the 38th midyear meeting of the group.

PICTURES IN THIS ISSUE:

Cover (top) — Hannes Fehn Photo; Cover (bottom) & pp. 38 & 39 — Cianci Photos; p. 23 — Wide World; p. 31 — U. S. Army; p. 40 — Wide World; p. 59 — Kaiden-Kazanjion Photo.

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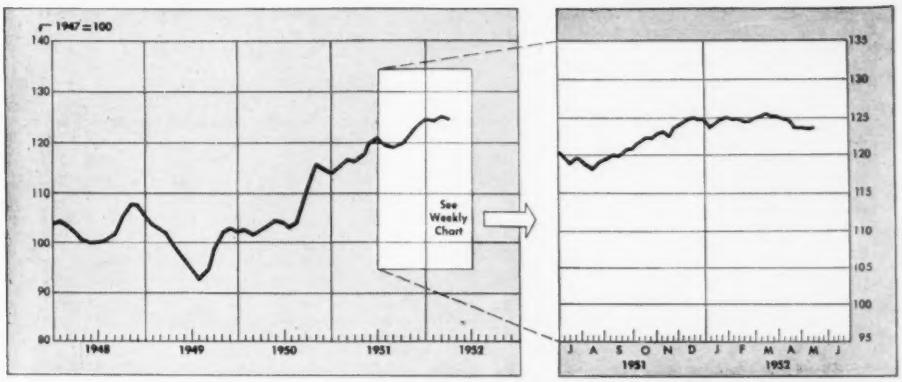

CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries

MARKET LETTER

Rubber is bouncing around Washington again this week. GR-S rubber, that is. RFC wants to get out of the synthetic rubber production business; Congress is insisting that the agency stay in.

The unusual situation—a government agency fighting to cut, not save its authority; Congress fighting to save, not cut that authority—has private producers, understandably enough, rooting for RFC.

But Capitol Hill will have its way. The U.S. will continue in the synthetic rubber production business be it for one year (House-favored), two years (Senate-recommended), eighteen months (a compromise).

The Office of International Trade's tossing of a little more ammunition RFC-way last week is probably just a coincidence. OIT let it be known that GR-S rubber exports are free from quota restrictions. Reason: Continued improvement of supplies.

In another sector, private industry was squaring off for a tussle with NPA. That government agency last week told prime copper producers its new copper allocation scheme.

The plan requires all domestic users of refined copper to accept 60% of their future allocations in domestic metal, the remaining 40% in high-priced foreign metal. NPA hope: The load of high-cost foreign copper will be spread among all consumers.

But not all news out of Washington is of a bickering nature. Some is innocuous, even encouraging.

DPA set an expansion goal for vulcanized fiber: 70 million pounds a year, a 10 million pound boost over 1951's 60 million capacity.

And minerals allocators are probably happy over the new production record boron mineral producers established in 1951. The record: 862,797 short tons as compared with 647,735 short tons in 1950.

Encouraging, too, is the National Petroleum Council's new report on petroleum productive capacity. Despite recurrent fears, we are not running out of oil.

Room for a boom in production and demand for natural gas is indicated in the estimated 1955 supply availability figures: 9.5-11.9 trillion cu. ft. (actual production in 1950—6.9 trillion cu. ft.).

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	123.9	124.4	121.0
Bituminous Coal Production (Daily average, 1000 tons)	1,497.0	1,398.0	1,623.0
Steel Ingot Production (thousand tons)	2,111.0	2,124.0	2,063.0
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	235.0	233.3	232.5
Chemical Process Industries Construction Awards (Eng. News-Record)	$4,092,000	$7,951,000	$4,538,000

MONTHLY INDICATORS—PRODUCTION (Index 1935-1939=100)	Latest Month	Preceding Month	Year Ago
All Manufacturing and Mining	216	220	223
Durable Manufactures	276	283	279
Non-durable Manufactures	184	188	198
All Chemical Products	295	294	296
Industrial Chemicals	567	563	532
By-product Coke	175	180	178

The Senate Banking and Currency Committee late last week issued its report on extension of the Defense Production Act; is convinced the government has to continue price, wage, priority powers over the national economy.

Some persuaders: 1) Larger defense expenditures; 2) Expected deficit financing through 1954; 3) Threat of further Russian "disturbances."

However, with a nod toward private industry, the Committee urges removal of controls "with all practical dispatch."

A new tailored price regulation is not in the cards for the coke, coal chemicals and coke oven industry. OPS, indefinitely extending SR-13 (which covers the industry), explains present circumstances do not warrant a custom-made regulation.

On the other hand supply-demand, not Washington may regulate the next price of lead. A fresh supply of foreign metal from Europe, principally Germany, is being offered at 14¢/pound—a cent below U.S. price.

It's a good bet the import duty (1 and 1/16¢/lb.) on lead will soon be reimposed. Reason: Lead prices in May averaged well below the 18¢/pound level.

What is a fair price for tin? RFC, Bolivian tin mine operators are still dickering. But chances are Yankee horse-trading will get the price down to $1.21½ a pound, the same price U.S. has paid other tin producers.

Original Bolivian demand for $1.50/pound was chewed down to $1.30, but a few small operators have already accepted RFC's $1.21½ offer.

What a difference a year makes. Sulfuric acid this time last year was in an exceedingly tight position; this week some sections of the country are calling supplies "longish."

Among the reasons: Sulfur from Texas Gulf Sulphur Co.'s multimillion dollar plant at Spindletop is beginning to hit the markets. Other causes: less sulfuric demand in some industries; not quite the need for as-high inventory levels.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending June 2, 1952

	Change	New Price		Change	New Price
UP					
Casein, Argentine, 100-bg. lots	$ .0025	$ .1575			
DOWN					
Wax, sugarcane, ref., dom., works	.05	.75	Neomycin, 1 kilo lots, grm.	.30	1.20
Sodium antimoniate, bbls., c.l.	.03	.35			

All prices per pound unless quantity is stated

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Curbs Off Resorcinol

Resorcinol last week was added to NPA's decontrol list. It may now be purchased without allocation authorization, but the armed services get priority.

Near-future increases in military, civilian demand will not upset current supply-demand balance, says NPA.

No details are forthcoming, but Heyden's new process will boost its production within six months—"if demand warrants it."

Resorcinol, Adam to a host of chemical reactions, market-wise is termed one of the more staid, stable products. Only three significant price changes in the last decade give evidence of that fact.

Under government controls since June 1951, as an Appendix A material (requiring both supplier and consumer to apply for allocation authorization) resorcinol last week was stricken from NPA's "unsanforized" list of chemical products under allocation. (The shrinking list this week shows only four left: naphthenic acid, thiokol, methylene chloride, polyethylene.)

Although resorcinol allocation controls are now off, NPA is protecting the nation's right-and-might flank. Military and atomic programs are guaranteed first call on all existing supplies through the priority system established in NPA's regulation 2. But this week defense orders, military demands are not gulping resorcinol as they were a few months ago; civilian buyers are finding it easier to get all they need—at least most of the time.

Phrase Flogging: Current producers Koppers (Petrolia, Pa.) and Heyden Chemical (Garfield, N.J.), and very soon-producer, Borden Co.'s Chemical Division (Dominguez, Calif.), are expecting to turn out a total of nearly 7 million pounds by the end of the year, should make industrial consumers a little happier. (Under controls, batch users had to order in restricted amounts, twiddle their thumbs until enough resorcinol was accumulated for use.)

Men who know resorcinol best say that 7 million pounds should wind up like this:

Estimated 1952-1953 End-Use Pattern

Pharmaceuticals	30-35%
Resins	20-30%
Rubber	10-15%
Dyestuffs	7-10%
Misc.	10-15%

But the picture may change abruptly. To flog a phrase, "If the so-called police action in Korea should . . . etc., etc. . . .", then the consumers with less urgent needs will be queing up again. This thinking is reflected in the spread-eagling estimated consumption of resorcinol in the resins category—20-30%. It is said military programs now in blue-print, drawing board stages call for a big chunk (but no one can pin-point the amount) of resorcinol for cold-set adhesives, other uses.

DPA notes, but doesn't say when, demand will increase considerably on the military and civilian fronts but upped requirements will be met by entrance of the new producer.

KOPPERS' COOPER: ". . . stable product, stable price."

Affable Elsie: Originally NPA authorized the construction at Tacoma, Wash., but a shortage of essential raw materials in that area forced Borden to switch the plant site to Dominguez. Which was nice switching.

Borden figures it will consume about 7 million pounds of raw materials (benzene, caustic soda, sulfuric acid) to produce its 1 million pounds of technical grade resorcinol annually. Stauffer Chemical (acid supplier) sold Borden the 7½ acre tract for the outdoor type chemical plant; benzene suppliers are not too distant.

And with plans to produce resin glues and industrial resins as well, Borden's Elsie is affably shaking hands with the southern California furniture, woodworking trade and the plastic molding, compounding industry in the area.

By January 1953, Borden's resorcinol output should hit about 85 thousand lbs./month*, says Ernest E. Novotny, Chemical Division vice-president. The estimated monthly output stacks up like this:

Month	M pounds
Aug., 1952	40
Sept.	60
Oct.	80
Nov.	80
Dec.	90
Jan., 1953	100

Big, Bigger, Biggest: This week, however, Borden is still playing the role of consumer, with Koppers Co. as its principal supplier. Koppers, Mr. Big of the resorcinol producers, estimates its capacity to be a towering 6 million pounds a year—more than thrice the combined output of Borden and Heyden.

Pricewise, as Koppers goes, so goes the field. But the price seldom goes anywhere. Says brisk, friendly Harold D. Cooper, Koppers' Eastern District Sales Manager, "Resorcinol is a stable commodity at a stable price. Only three fluctuations in more than ten years attest to that. And", adds Mr. Cooper, "resorcinol's steady price over the years is probably the reason competition has been kept to a minimum."

In 1949 tech. grade resorcinol was selling for about 74-75¢/pound in c.l. lots. By November 1950 it had scooted up to 84-85¢/pound, highest level since 1939. The following year OPS slapped a ceiling on resorcinol with a mark-down to 82½-83½¢/pound. There the figure remains. And will probably remain for some time.

Concludes Cooper, "Price now, as in the past, reflects basic manufacturing costs." (Koppers, only producer of USP grade resorcinol, currently lists its crystals at $2.75/pound, powder, $2.95/pound. Supply is running about 30 days behind demand.)

Hush Hush: Heyden Chemical Corp.'s Garfield, N.J. plant, (partially destroyed by fire a little more than a year ago) is now knocking out a steady 50 thousand pounds of resorcinol a month. But there is something more in the wind. A new, simplified process, now in the pilot plant stage, will sizably increase Heyden's output.

Because of its patent situation, Heyden is reluctant to reveal details. How-

* Estimating 1 million pounds/year, Borden nevertheless is stretching for 1.2 millions.

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ever, Ralph N. Lulek, Heyden's versatile vice-president did tell CW the anticipated increase over Heyden's present 600 thousand pounds-a-year production "will not depend simply on enlarging capacity on the same basis.

"It is something a little different," the good doctor went on to say, "and the results may be apparent in the near future."

Government Needs

Commanding Officer, Fort McPherson, Fort McPherson, Ga.

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June 11	B54321B	250731 lbs.	Resin para phenyl phenol formaldehyde spec MIL R15184A
" "	B54323B	164000 lbs.	Phenol carbolic acid spec O P 281, amend 1
" "	B54327B	8000 gals.	Tricresyl phosphate spec TT T 656, amend 1
" "	B54319B	28000 gals.	Varnish asphalt jet black spec TT B 51A, amend 1

Chicago Chemical Procurement District, Room 902, 226 West Jackson Blvd., Chicago, Ill.

June 13	(CML-11-021-52-66)	24	Kit, chemical agent, analyzer, M10
" "	"	1	Kit, chemical agent, analyzer, M10
" "	"	26	Kit, smoke, identification, M11
" "	"	6	Kit, smoke, identification, M11

Procurement Division, Supply Service, Veterans Administration, Washington 25, D.C.

June 10	S-243	22620 gals.	Compound, water and stain repellent, 30 gal. ctr.
June 11	S-244	113600 lbs.	Soda ash
June 9	P-72	432 pkg.	Glue, flake or ground, 1 lb. pkg.
" "	"	96 pkg.	Glue, casein, water-resistant, 1 lb. pkg.
" "	"	384 tb.	Glue, liquid, ordinary, 2 oz. tube
" "	"	624 cn.	Glue, liquid, ordinary, ½ pt. can
June 10	P-73	1416 cn.	Thinner, lacquer, 1 gal. can
" "	"	576 cn.	Lacquer, clear, 1 qt. can
" "	"	240 jr.	Lacquer, transparent, 1 pint jar
" "	"	384 cn.	Varnish, transparent, ½ gal. cn
" "	"	1872 cn.	Varnish, shellac, 1 pint can
" "	"	204 cn.	Varnish, shellac, 1 gal. can
" "	"	144 cn.	Varnish, shellac, 1 qt. can
" "	"	828 cn.	Varnish, Spar, ½ gal. can
" "	A-126	288 btl.	Phenobarbital, ¼ lb.
" "	"	96 btl.	Phenobarbital, 1 lb.
" "	"	2496 btl.	Potassium dichromate
" "	"	6528 btl.	Paraldehyde
" "	"	744 btl.	Nitric acid
" "	"	96 btl.	Mercuric nitrate
" "	"	600 btl.	Magnesium oxide, heavy
" "	"	360 btl.	Magnesium trisilicate
" "	"	2520 btl.	Acacia

Commandant of the Marine Corps, Washington, D.C.

June 10	1198B	620 ea	Charges, fire extinguisher, foam chemical, type 1, joint Army Navy Spec JAN-C-267 and amend
June 10	1198B	17000 gal	Fire extinguishing liquid carbon tetrachloride base, regular in 1 gal. cans, type 1 Fed. spec O-F-380A and amend

Vicksburg District, Corps of Engineers, P.O. Box 60, Vicksburgh, Miss.

June 11	(CIVENG-22-052-52-194B)	102200 lbs	Herbicide ammonium sulfamate in non-returnable containers 350 lbs per container Wetting agent for same

Government Awards

Item	Amount	Dollar Value	Supplier	Location
Armed Services Medical Procurement Agency, 84 Sands Street, Brooklyn 1, New York				
Gylcerin	12960	47,169	Vegetable Oil Products	Los Angeles, Calif.
Codeine Sulfate	5448	60,490	Rexall Drug Co.	Boston, Mass.
Disinfectant, Germicide & Fungicide Solution	17113	48,429	Fine Organics, Inc.	New York
Mercury	12528	35,414	Metalsalts Corp.	Hawthorne, N.J.
Oakland QM Procurement Agency, U.S. Army, 124 Grand Ave., Oakland 12, Calif.				
NEG Soap, toilet	76028 cake	43,606	Lever Bros.	New York
Soap, powder	47016 pkg		" "	" "
Shortening	35028 can		" "	" "
NEG Shortening	62628 can	71,286	The Procter & Gamble Dist. Co.	San Francisco, Cal.
Soap, toilet	70772 cake		" "	" " "
Soap, powder	98448 pkg		" "	" " "
Synopsis of Awards issued by the Navy Purchasing Office, New York, N.Y.				
Insecticide	55000 lb	209,149	California Spray Chemical Corp.	Richmond, Calif.
Insecticide	25000 lb	94,000	Food Machinery & Chemical Corp.	Middleport, N.Y.
Corps of Engineers, U.S. Army, Philadelphia District, P.O. Box 8629, Philadelphia 1, Pa.				
Foam making solution, fire extinguisher, 2 gallon container	14854	45,857	The Mearl Corp.	New York, N.Y.

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P 4340 Chemical Week
520 N. Michigan Ave., Chicago 11, Ill.

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P 4410 Chemical Week
330 W. 42nd St., New York 36, N.Y.

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P4396 Chemical Week
520 N. Michigan Ave., Chicago 11, Ill.

Chief Chemist wanted by prominent Eastern brass, bronze, white metal and aluminum smelter. Thoroughly experienced man to serve as Chief Chemist. Excellent salary for qualified man. Give complete information in letter. P-4413, Chem. Wk.

General Manager—Process Equipment Mfr. Opportunity for top caliber executive to take over reins of privately owned, nationally known, profitable equipment business now entering period of greatest growth and expansion. Applicant should have extensive record in process equipment field, with emphasis on sales and organization, ability to coordinate engineering and manufacturing, and to plan overall conduct of business. Unusual opportunity. Executive we seek is probably now unsatisfactorily employed in similar capacity without future earning potential, or under conditions restricting initiative or ability. Reply directly, or through your attorney, if you prefer, giving detailed qualifications, experience and salary-bonus desired. P-4339, Chemical Week.

Selling Opportunity Wanted

Sales Administration—Dependable, rapid assistant. Sales, nat'l distrib, consumer & ind'l chems., promotion, adver. campaigns, supervise salesmen. Administration: run office, corres., orders, records; bulletins; quota contests; market research; costs; mgmt. reports. Techincal: basic chemistry, solvents, cleaners, inhibitors, oils, etc. Desire tough job, future, responsibility, many functions. BBA, 34, married, $6,000. Personable, like to work. RA-4388, Chemical Week.

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Calenders, New Rubber Calenders, 6x12", Johnson Joints, 7½ HP motor, Complete. Eagle Industries, 108 Washington St., NYC.

Centrifugals, Bird 48"; Rub. Covered. First Machinery, 157 Hudson St., N.Y. 13, N.Y.

Dryer; P.&S. 76' L; 13' w; S.S. belt. First Machinery Corp, 157 Hudson St., N.Y. 13, N.Y.

Dryer, Vacuum Shelf, 13 shelves 59"x78", Condenser and pump. Consolidated Products, 18 Park Row, N.Y. 38, N.Y. BArclay 7-0600.

Dryer, Vacuum shelf, 20 shelves, 59x78", pump, cond., 6. Consolidated Prod., 18 Pk. Row, NY 38.

Dryers, 2 Bfvk 32x90 dble. drum, SS accessories, compl. Eagle Indus., 108 Washington St., NYC.

Evaporator, (five body quad) and 12' spray dryer, both type 304 s/s, 220/440 v., explosion-proof, new, never set up. FS-4429, Chemical Week.

Evaporators; Sextuple Eff. 58,200 sq. ft. First Machinery Corp., 157 Hudson St., N.Y. 13.

Filters, all sizes and types. Perry Equipment, 1415 N. 6th St., Phila. 22, Pa.

Filter Press, 30"x30", aluminum, 45 chambers, Consolidated Products, 18 Park Row, N.Y. 38.

Filter Presses, all sizes and types. Process Industries, 305 Powell St., Brooklyn 12, N.Y.

Granulator, Allis Chalmers, Ball, 4'6"x7', iron lined. Used 100 hours. Consolidated Products, 18 Park Row, New York 38, N.Y. BA 7-0600

Kettles, S/S, 300 gal. and 200 gal., 100#, WP. Consolidated Products, 18 Park Row, N.Y. 38.

Mill, New Rubber Mills, 6x12, 6x14, 6x16"; Johnson Joints, Complete. Eagle Industries, 108 Washington St., NYC.

Mills, Raymond #5047 high side roller, ea. w/two 50 h.p. 3/60/2200 V motors, piping (4). Consolidated Products, 18 Park Row, N.Y. 38.

Mills, Traylor tube, 5'x22', 5'x20', 4'6"x18'6", 4'x13', stone lined, pebble charge (4). Consolidated Products, 18 Park Row, New York 38, N.Y

Mixer, Lab, BP Vacuum, 7½ gal. jktd, MD. Complete. Eagle Industries, 108 Washington St., NYC.

Mixer Lab.—Day S.S. Jktd. Vac. 5 gal Equipment Clearing House, 289 10 St., Bklyn 15.

Mixers, AMF, Glen, 340 qt., 160 qt. & 120 qt., S/S bowls & beaters, AC motors, 4. Consolidated Products, 18 Park Row, N.Y. 38.

Mixers, horiz. ribbon, 14'x7'6"x6', jktd., 600 cu. ft. (2). Consolidated Products, 18 Park Row, N. Y. 38.

Pebble Mills; 8'x8', Porcelain lined. First Machinery Corp., 157 Hundson St., N.Y. 13, N.Y.

Pebble Mills 10 gal. to 800 gal., porcelain lined, 20. Consolidated Products, 18 Park Row, N.Y. 38.

Tablet Press, Stokes R, single punch, Consoli dated Products, 18 Park Row, N.Y. 38.

Tanks, 2 10000 gal. SS Storage, excel. Cond. Eagle Industries, 108 Washington St.. NYC.

For Sale

Tanks—Glass lined steel storage, 3,000 gal. cap. Complete fittings, outlet valve, manhead, agitator. Briggs & Turivas, 141 W. Jackson, Chicago 4, Ill.

Tanks, SS, from 180-10000 gal, jktd, storage, agtd. Eagle Industries, 108 Washington St., NYC.

Tanks, S.S. Storage & Mixing, all capacities. Process Industries, 305 Powell St., Brooklyn 12.

Tanks, S/S, from 30 to 5700 Gal. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

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BOOKS . . . . . .

Statistical Theory with Engineering Applications, by Anders Hald. John Wiley & Sons, Inc., New York, N.Y.; 783 pp., $9.

An exposition of current statistical theories with emphasis on the methods developed by R. A. Fisher, the volume contains numerous practical engineering illustrations—without bringing in advanced mathematics.

Statistical Tables and Formulas, by Anders Hald. John Wiley & Sons, Inc., New York, N.Y.; 97 pp., $2.50.

Published in conjunction with the above, this volume comprises a collection of tabular data as a supplement to the text book.

Modern Chemical Processes, Vol. 2, by the editors of *Industrial and Engineering Chemistry.* Reinhold Publishing Corp., New York, N.Y.; 299 pp., $5.

The second volume of the series devoted to recently developed plant processes, reviews 24 chemical processes with reference to background, plant installation, plant processing and operation, process economics, personnel and future prospects.

Valence, by C. A. Coulson. Oxford University Press, New York, N.Y.; vii+338 pp., $5.

A treatise on the theory of valence, from the approach of modern wave mechanics, the book develops both of the two main competing theories—the molecular orbital and valence-bond methods—in parallel manner and examines the chief ideas, methods and techniques behind each of them. The author deals with diatomic and polyatomic molecules as well as with aromatic systems.

Planning and Developing the Company Organization Structure, by Ernest Dale. American Management Assn., New York, N.Y.; 232 pp., $4.50.

A research report analyzing the development and change of the organizational structure of the individual company, both from the standpoint of systematic methods and that of practical common sense solutions used in business. The two main sections of the book deal with first, organization growth problems and, secondly, the mechanics of organization.

Briefly Listed

ASTM Specifications for Steel Piping Materials, 384-page 1952 edition containing the 56 widely used ASTM specifications for carbon-steel and alloy-steel pipes, tubes, castings, forgings and bolting. American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.; $3.50.

Technical Cooperation with Underdeveloped Countries, by P. C. Newman, J. E. Ullmann and R. S. Aries, 98-page publication reviewing and analyzing the economic potentialities of undeveloped areas in terms of actual industrial planning. Chemonomics, Inc., 400 Madison Ave., New York, N.Y.; $5.

Communication of Technical Information, by Robert M. Dederich, 116-page book written for engineering and science students, technical workers, and management men, covering the theory and practice of technical communication. Chemonomics, Inc., 400 Madison Ave., New York, N.Y.; $5.

Liquid Chlorine, 57-page revised edition of technical bulletin discussing liquid chlorine in respect to properties, transportation equipment and safe handling. Allied Chemical & Dye Corp., 40 Rector St., New York, N.Y.; free on request.

Permutit Water Conditioning Data Book, 116-page volume presenting a compilation of 77 tables plus textual material designed to aid the engineer working with water conditioning problems. The Permutit Co., 330 West 42nd St., New York, N.Y.; free on request.

MEETINGS...

Chem. Specialties Mfrs. Assn., mid-year meeting, Sheraton-Plaza Hotel, Boston, June 9-10.

Amer. Plant Food Council, annual meeting, The Homestead, Hot Springs, Va., June 10-22.

Natl. Fire Protection Assn., annual meeting, Statler Hotel, N.Y., June 9-13.

Div. of Medicinal Chem., national chemistry symposium, Univ. of Virginia, Charlottesville, June 12-14.

Natl. Fertilizer Assn., annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., June 16-18.

Drug, Chemical and Allied Trades section of N.Y. Board of Trade, spring luncheon meeting, Astor Hotel, N.Y., June 11.

Div. of Analytical Chem., annual summer symposium, Michigan State College, East Lansing, June 20-21.

Forest Products Res. Soc., annual meeting, Schroeder Hotel, Milwaukee, Wis., June 23-25.

Mfg. Chemists Assn., joint meeting with SOCMA, Greenbrier Hotel, White Sulphur Springs, W. Va., June 23-25.

Synth. Org. Chem. Mfrs. Assn. of the U.S., annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., June 23-25.

Amer. Soc. for Testing Materials, annual meeting, Statler & New Yorker Hotels, June 23-27.

BOOKLETS . . . . . .

Chemicals

Commercial Chemicals
8-p. price list noting the prices, shipping weights, manufacturer, and manufacturer's specifications of 189 fine organic chemicals available from basic chemical manufacturers in 55 gallon drums, but packed by this firm in small quantities, making possible better service on small shipments. The Matheson Co., Inc., East Rutherford, N.J.

Food and Beverage Products
71-p. booklet giving technical, packaging and background information on the firm's line of products—vitamins, acidulants, antioxidants, salts, etc.—used in the food and beverage industries. Chas. Pfizer & Co., 630 Flushing Ave., Brooklyn, N.Y.

Wet-Strength Resin
Small folder describing the use of "Kymene," a strongly cationic resin, as the means for obtaining better wet-strength bags. Test data given is compared with government specifications. A sample Kymene-treated paper bag sample is included. Hercules Powder Co., Wilmington, Del.

Silicated Detergents
Folder describing five silicated detergents, charts diversified industrial cleaning operations with suggested detergent, concentration and general directions. Philadelphia Quartz Co., Public Ledger Bldg., Philadelphia, Pa.

Sodium Dispersions
4-p. technical bulletin, the fourth in a series on the new, highly reactive form of metallic sodium, contains data on the formulation of sodium dispersions in various media; typical combinations of media, dispersants, and stabilizers are presented, and the dispersion's properties, such as sodium content, stability, fluidity, etc., are noted. National Distillers Chemical Co., Ashtabula, Ohio.

Equipment

Phenolic Resin
8-p. bulletin giving technical data on the firm's phenolic foamable resin, as used for packaging purposes, describes material's properties, processing, and advantages as well as methods of packing objects in the phenolic plastic. Bakelite Co., 300 Madison Ave., New York, N.Y.

Processing Machinery
16-p. booklet covering conveying, processing and power transmission machinery, especially designed for the grain milling and processing industries. Booklet includes information on the construction and function of screw, belt and oscillating conveyors, drives, vibrating screens and several types of dryers and coolers. Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.

Mixing Machines
4-p. bulletin presenting descriptive information and tabular data on the firm's line of intensive mixers, dispersion machines, mixing machines and kneading machines, all designed for heavy duty intensive mixing through light duty mixing and kneading. Struthers Wells Corp., Titusville, Pa.

General Purpose Motors
6-p. folder covering the construction features, applications, ratings and dimensions of the firm's open drip-proof and splash-proof squirrel-cage induction motors, available in ratings of ½ to 100 horsepower. Allis-Chalmers Mfg. Co., 1150 S. 70th St., Milwaukee, Wis.

Laboratory Scales
4-p. folder reviewing various models of scales and laboratory balances and specifying the particular purpose, dial graduations and capacity of each. Exact Weight Scale Co., 944 West Fifth Ave., Columbus, Ohio.

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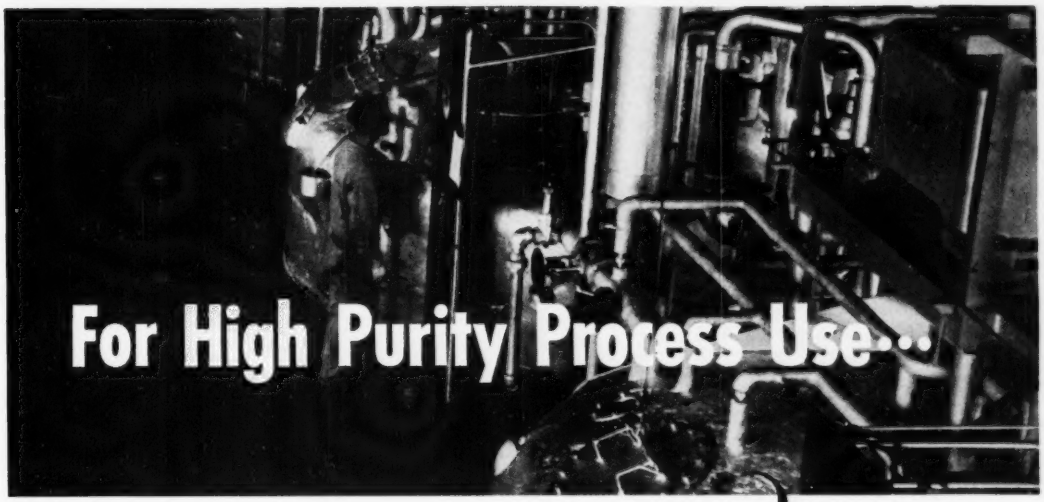

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